वार्षिक प्रतिवेदन
ANNUAL REPORT
2023-2024

सीएसआईआर
CSIR
भारत का नवाचार इंजन
The Innovation Engine of India

सी एस आई आर - राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी संस्थान
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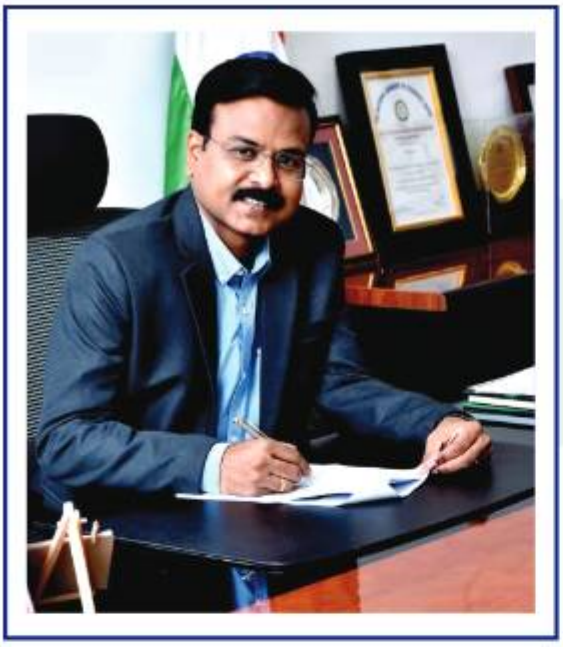


सीएसआईआर का अंतर्विषयी आयाम
Interdisciplinary face of CSIR

निदेशक की कलाम से..

मुझे 2023-24 के लिए सीएसआईआर-एनआईआईएसटी की वार्षिक रिपोर्ट प्रस्तुत करते हुए खुशी हो रही है। यह रिपोर्ट पिछले वर्ष की हमारी प्रगति, उपलब्धियों और नवाचारों को समेटे हुए है, जो तेजी से विकसित हो रहे अंतर्विषयी अनुसंधान परिदृश्य में उत्कृष्टता के प्रति हमारी प्रतिबद्धता को उजागर करती है।

वर्ष 2023-24 में, सीएसआईआर-एनआईआईएसटीने सरकारी एजेंसियों, उद्योग भागीदारों और शैक्षणिक संस्थानों के समर्थन से विज्ञान, प्रौद्योगिकी और मानव संसाधन विकास में उल्लेखनीय प्रगति की है। हमारे उच्च प्रभाव वाले शोध प्रकाशन, पेटेंट और अग्रणी परियोजनाएं उत्कृष्टता के प्रति हमारे समर्पण को प्रदर्शित करती हैं।

2023-24 में, सीएसआईआर ने आला निर्माण परियोजनाओं (एनसीपी), केंद्रित बुनियादी अनुसंधान (एफबीआर), फास्ट ट्रैक ट्रांसलेशनल (एफटीटी), फास्ट ट्रैक व्यावसायीकरण (एफटीसी) और मिशन मोड योजनाओं के तहत परियोजनाओं को सफलतापूर्वक कार्यान्वित किया। इन परियोजनाओं में खनन, खनिज, धातु और सामग्री; रसायन (चमड़ा और पेट्रोकेमिकल्स सहित); ऊर्जा (पारंपरिक और गैर-पारंपरिक) और ऊर्जा उपकरण; पारिस्थितिकी, पर्यावरण, पृथ्वी विज्ञान और जल; कृषि, पोषण और जैव प्रौद्योगिकी; और स्वास्थ्य सेवा जैसे विषय शामिल थे। इसके अतिरिक्त, हमने विभिन्न वित्तपोषण एजेंसियों और मंत्रालयों द्वारा समर्थित बड़ी संख्या में अनुदान-सहायता परियोजनाएं भी हासिल कीं।

अपनी वैज्ञानिक और तकनीकी क्षमताओं को आगे बढ़ाने के दृष्टिकोण के साथ, सीएसआईआर-एनआईआईएसटी ने औद्योगिक क्षेत्र के साथ साझेदारी विकसित करने और सहयोग को बढ़ावा देने के लिए उद्योग-कनेक्ट कार्यक्रमों को सक्रिय रूप से शुरू किया है। इन बातचीत के परिणामस्वरूप, हमने सफलतापूर्वक मूल्यवान समझौता ज्ञापन और समझौते स्थापित किए हैं, साथ ही हमारे सम्मानित औद्योगिक ग्राहकों के साथ प्रौद्योगिकी हस्तांतरण, साथ ही प्रायोजित और परामर्श परियोजनाओं में भी उल्लेखनीय वृद्धि हुई है।

पिछले एक साल में, सीएसआईआर-एनआईआईएसटी ने विभिन्न वित्तीय मेट्रिक्स में प्रभावशाली वृद्धि हासिल की है, जो अनुसंधान और विकास गतिविधियों के लिए आवंटित संसाधनों में उल्लेखनीय वृद्धि को दर्शाता है। सीएसआईआर के अनुसंधान एवं विकास बजट में 173% की वृद्धि हुई, जो नवाचार को बढ़ावा देने में पर्याप्त निवेश का संकेत है। इसके अतिरिक्त, ईसीएफ (बाहरी वाणिज्यिक वित्तपोषण) सृजन में उल्लेखनीय 188% की वृद्धि हुई, जो 2022-23 में ₹10.48 करोड़ (1048 लाख) से बढ़कर 2023-24 में ₹19.67 करोड़ (1967 लाख) हो गई। एलआरएफ (दीर्घकालिक अनुसंधान वित्तपोषण) में भी 151% की पर्याप्त वृद्धि हुई, जो 2022-23 में ₹239 करोड़ से बढ़कर 2023-24 में ₹362 करोड़ हो गई। ये उल्लेखनीय उपलब्धियाँ उत्कृष्टता और नवाचार के प्रति संगठन की प्रतिबद्धता को रेखांकित करती हैं।

अभूतपूर्व शोध में सबसे आगे, सीएसआईआर-एनआईआईएसटीने पर्यावरण, स्वास्थ्य और तकनीकी चुनौतियों का सफलतापूर्वक सामना किया है। हमारी उल्लेखनीय उपलब्धियों में पर्यावरणीय मुद्दों से निपटने के लिए कृषि बायोमास से बायोडिग्रेडेबल कटलरी और

शाकाहारी चमड़े का निर्माण, दोहरी कीटाणुशोधन-ठोसीकरण प्रणाली के साथ जैव चिकित्सा अपशिष्ट प्रबंधन में अग्रणी प्रयास, SERS और UV फोटोडिटेक्शन तकनीकों का उपयोग करके कैंसर निदान में प्रगति, जैव-हाइड्रोजन उत्पादन, एकीकृत फोटोवोल्टिक्स, एग्रीवोल्टिक्स, इनडोर लाइट हार्वेस्टिंग यूनिट, ऑन-साइट जल उपचार इकाइयाँ, और बहुत कुछ शामिल हैं। हमने जैव ईंधन उत्पादन, सॉलिड-स्टेट किण्वन, थर्मल वियर के लिए मुद्रित इलेक्ट्रॉनिक्स, बायोडिग्रेडेबल कॉयर-जियो कंपोजिट और उन्नत मिश्र धातुओं के साथ ऑटोमोटिव एयर कंप्रेसर के संवर्द्धन के लिए एंजाइम प्रौद्योगिकी में भी महत्वपूर्ण प्रगति हासिल की है।

एक प्रतिष्ठित NABET मान्यता प्राप्त, श्रेणी A सलाहकार संगठन के रूप में, हम अत्यंत सटीकता और विशेषज्ञता के साथ व्यापक पर्यावरण प्रभाव आकलन अध्ययन (EIA) आयोजित करने में माहिर हैं। हमारी अत्याधुनिक परीक्षण और विश्लेषण प्रयोगशाला में प्रतिष्ठित NABL मान्यता है, जो पानी, अपशिष्ट जल, डाइऑक्सिन, फ्यूरान और पॉली क्लोरीनेटेड बाइफिनाइल्स (PCBs) के सावधानीपूर्वक विश्लेषण पर ध्यान केंद्रित करती है।

ग्लोबल इनोवेशन इंडेक्स 2023 के आधार पर, भारत ने 132 अर्थव्यवस्थाओं में 40वां स्थान हासिल किया है, जो निम्न-मध्यम आय वर्ग और मध्य और दक्षिणी एशिया में अग्रणी है। लगातार विकसित हो रहे स्टार्टअप परिदृश्य के अनुकूल होने की आवश्यकता को स्वीकार करते हुए, हमने सीएसआईआर-एनआईआईएसटी में नवाचार केंद्र की नींव रखी है। यह केंद्र वैज्ञानिक और तकनीकी ज्ञान का उपयोग करने और उसे अभूतपूर्व नवाचारों और व्यवहार्य व्यावसायिक उपक्रमों में बदलने के लिए एक समावेशी वातावरण को बढ़ावा देने के लिए समर्पित है। हमारा लक्ष्य सीएसआईआर-एनआईआईएसटी को देश में प्रमुख नवाचार केंद्र के रूप में स्थापित करना है, जो अनुवाद संबंधी अनुसंधान और विकास, ऊष्मायन, ज्ञान-आधारित उद्यमिता और बाजार-संचालित व्यावसायिक रणनीतियों पर ध्यान केंद्रित करता है। नवाचार केंद्र स्टार्टअप और शुरुआती चरण के उद्यमों को बढ़ावा देने के लिए रणनीतिक मूल्यांकन, सुरक्षा, लाइसेंसिंग और प्रौद्योगिकी हस्तांतरण को प्राथमिकता देती है।

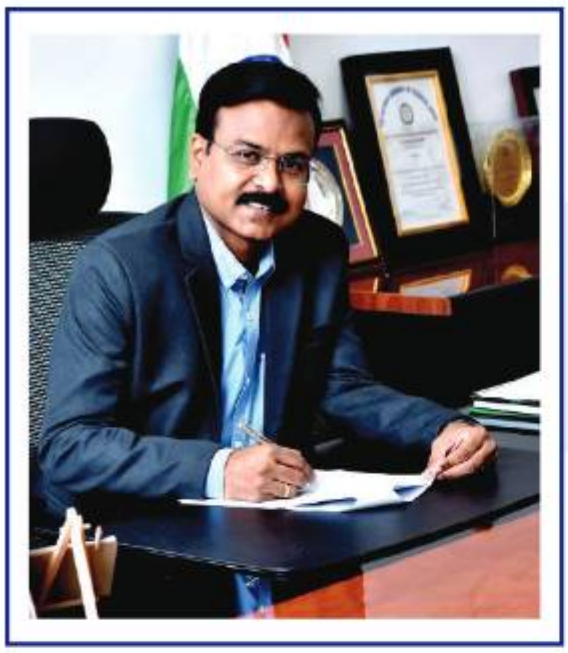
इसके अलावा, सीएसआईआर-एनआईआईएसटी को एफएसएसएआई द्वारा संदूषकों (भारी धातु, पीसीबी, डाइऑक्सिन और प्रक्रिया-जनित संदूषक) के लिए राष्ट्रीय संदर्भ प्रयोगशाला (एनआरएल) के रूप में नामित किया गया है। हमें कृषि अपशिष्ट से शाकाहारी चमड़ा विकसित करने के लिए पेटा इंडिया से वस्त्रों में सर्वश्रेष्ठ नवाचार का पुरस्कार भी मिला है।

हमने मानव संसाधन और शैक्षणिक प्रभाग, जिज्ञासा और कौशल विकास पहल के तहत, हमने युवा दिमागों से जुड़ने और वैज्ञानिक जिज्ञासा को बढ़ावा देने के लिए पर्याप्त प्रयास किए हैं और कौशल विकास कार्यक्रम, विज्ञान दिवस, प्रौद्योगिकी दिवस, सीएसआईआर स्थापना दिवस और सीएसआईआर-एनआईआईएसटी स्थापना दिवस जैसे कार्यक्रमों से उद्योगों, शिक्षाविदों और जनता से उत्साहपूर्ण भागीदारी मिली।

मैं सीएसआईआर-एनआईआईएसटी के सभी लोगों को उनके अटूट समर्पण और समर्थन के लिए हार्दिक धन्यवाद देता हूँ। मैं सीएसआईआर, केंद्र और राज्य सरकारों, सार्वजनिक और निजी क्षेत्र के हितधारकों, हमारे ग्राहकों, शुभचिंतकों और मीडिया के प्रति भी आभार व्यक्त करता हूँ, जिन्होंने सीएसआईआर-एनआईआईएसटी को एक जीवंत संगठन में बदलने में योगदान दिया। हम भविष्य में और भी बड़ी उपलब्धियाँ हासिल करने के लिए प्रतिबद्ध हैं।

सीएसआईआर के महानिदेशक, सीएसआईआर मुख्यालय और आरसी सदस्यों को उनके पूरे दिल से समर्थन के लिए विशेष धन्यवाद।

सी. आनंदरामकृष्णन
निदेशक, सी एस आई आर-एन आई आई एस टी



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सीएसआईआर का अंतर्विषयी आयाम
Interdisciplinary face of CSIR

Foreword

It is with great pleasure and a sense of privilege that I present the Annual Report of CSIR-NIIST for the period 2023-24. This report encapsulates our progress, achievements, and innovations over the past year, highlighting our commitment to excellence in a rapidly evolving interdisciplinary research landscape.

In the year 2023-24, CSIR-NIIST has made remarkable strides in advancing science, technology, and human resource development. This progress has been made possible through the support of all our stakeholders namely central and state government agencies, industry partners, educational institutions. Our dedication to excellence is evident in our high-impact research publications, patents, and pioneering projects.

The year 2023-24 saw the successful implementation of various projects under CSIR's NCP (Niche Creating Projects), FBR (Focused Basic Research), FTT (Fast Track Translational), FTC (Fast Track Commercialization), and mission mode schemes. These projects spanned several themes, including Mining, Minerals, Metals and Materials; Chemicals (including leather and petrochemicals); Energy (conventional and non-conventional) and Energy devices; Ecology, Environment, Earth Sciences and Water; Agriculture, Nutrition and Biotechnology; and Healthcare. We also secured a significant number of grant-in-aid projects supported by various funding agencies and ministries.

In line with our vision to extend our scientific and technological advancements, CSIR-NIIST organized industry-connect programs to foster engagement with the industrial sector and form new partnerships. These interactions provided valuable insights into industrial needs, leading to several MoUs and agreements. Furthermore, there was a notable increase in technology transfer, sponsored and consultancy projects to our industrial clients during this period.

There have been impressive increases in several financial metrics related to CSIR-NIIST over the past year. The CSIR R&D budget saw a substantial increase of 173% compared to previous years. This indicates a significant boost in the resources allocated for research and development activities. There was a remarkable increase of 188% in ECF (External Commercial Funding) generation, rising from ₹10.48 crores (1048 lakhs) in 2022-23 to ₹19.67 crores (1967 lakhs) in 2023-24. The LRF (Long-term Research Funding) also saw a considerable rise of 151%, increasing from ₹239 crores in 2022-23 to ₹362 crores in 2023-24.

At the forefront of innovation-driven research, CSIR-NIIST has addressed critical environmental, health, and technological challenges. Our notable achievements include the development of biodegradable cutlery and vegan leather from agricultural biomass to combat environmental issues, pioneering efforts in biomedical waste management with a dual disinfection-solidification system, advancements in cancer diagnostics using SERS and UV photodetection technologies, bio hydrogen generation, building integrated photovoltaics, agrivoltaics, indoor light harvesting unit, onsite water treatment unit etc. We have also made significant progress in enzyme technology for biofuel production, solid-state fermentation, printed electronics for thermal wear, biodegradable coir-geo composites, and the enhancement of automotive air compressors with advanced alloys.

As a NABET accredited, Category A consultant organization, we excel in conducting Environmental Impact Assessment Studies (EIA). Our Testing and Analysis Laboratory is NABL accredited, specializing in the analysis of water, wastewater, dioxins, furans, and Poly Chlorinated Biphenyls (PCBs).

According to the Global Innovation Index 2023, India ranks 40th among 132 economies and leads in the lower-middle income group and Central and Southern Asia. Recognizing the importance of adapting to the dynamic start-up ecosystem, we established the Innovation Center at CSIR-NIIST. This center aims to create an inclusive ecosystem for developing and translating scientific and technical knowledge into innovations and commercial ventures. Our goal is to position CSIR-NIIST as the leading innovation hub in the country for translational R&D, incubation, knowledge-based entrepreneurship, and market-oriented business strategies. The Innovation Center will focus on strategic evaluation, protection, licensing, and technology transfer to support start-ups and early-stage companies.

Furthermore, CSIR-NIIST has been designated as a National Reference Laboratory (NRL) for contaminants (Heavy metals, PCBs, Dioxins, and process-generated contaminants) by FSSAI. We also received the Best Innovation in Textiles award from Peta India for developing vegan leather from agricultural waste.

Under the Human Resource and Academic Division, Jigyaasa, and Skill Development initiatives, we have made substantial efforts to engage with young minds and foster scientific curiosity. We celebrated various events, including Skill Development Programs, Science Day, Technology Day, CSIR Foundation Day, and CSIR-NIIST Foundation Day, which received enthusiastic participation from industries, academia, and the public.

I extend my heartfelt thanks to everyone at CSIR-NIIST for their unwavering dedication and support. I also express my gratitude to CSIR, the central and state governments, public and private sector stakeholders, our clients, well-wishers, and the media for their contributions in transforming CSIR-NIIST into a vibrant organization. We remain committed to achieving even greater milestones in the future.

A special word of appreciation goes to the Director General of CSIR, the CSIR Headquarters, and RC members for their wholehearted support.

Dr. C. Anandharamakrishnan
Director, CSIR-NIIST

Research Council of CSIR-NIIST

(w.e.f. 1st September 2023)

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(Till 31st August 2023)

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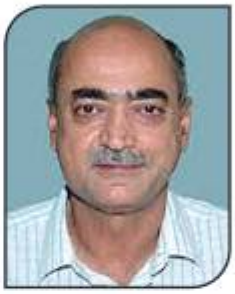

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and J.C Bose Council of Scientific
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Vadodara Manufacturing Division,
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CSIR HQ. INVITEE

Dr. D. S. TIWARI
Sr. Principal Scientist,
Technical Management Directorate

RC SECRETARY

Dr. P. NISHY
Chief Scientist, CSIR-NIIST

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(w.e.f. 1st January 2024)

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Director, CSIR-NIIST

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Dr. RAKHI R. B.
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Scientist

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Mr. R. RAJEEV
Sr. Superintending Engineer

Dr. SOMU ROY
Finance & Accounts Officer

Shri. ANTONY PETER RAJA
Administrative Officer


Significant
Achievements

महत्वपूर्ण उपलब्धियां 2023-2024

वर्ष 2023-24 में, सीएसआईआर-एनआईआईएसटी ने विज्ञान, प्रौद्योगिकी और मानव संसाधन विकास में महत्वपूर्ण प्रगति हासिल की है,जिसका श्रेय केंद्रीय और राज्य सरकार की एजेंसियों, शैक्षणिक संस्थानों और सार्वजनिक और निजी दोनों क्षेत्रों जैसे हितधारकों के महत्वपूर्ण योगदान को जाता है।

सीएसआईआर-एनआईआईएसटी ने विभिन्न एजेंसियों द्वारा वित्तपोषित 181 विविध परियोजनाओं का प्रबंधन किया। इसके अतिरिक्त, विभिन्न विषयों को कवर करते हुए 27 सीएसआईआर परियोजनाओं को सफलतापूर्वक शुरू किया गया। शोध आउटपुट में 319 प्रकाशन, 31 पीएचडी थीसिस और एक उल्लेखनीय पेटेंट पोर्टफोलियो शामिल हैं।

यह संस्थान अंतर्विषयी अनुसंधान में उत्कृष्टता प्राप्त है,जो पर्यावरण, स्वास्थ्य और तकनीकी मुद्दों को संबोधित करने में अग्रणी है।कृषि प्रसंस्करण एवं प्रौद्योगिकी प्रभाग ने पर्यावरण संबंधी मुद्दों से निपटने के लिए कृषि बायोमास से बायोडिग्रेडेबल कटलरी बनाई है।रासायनिक विज्ञान तथा प्रौद्योगिकी प्रभाग SERS और UV फोटोडिटेक्शन तकनीकों के साथ कैंसर निदान में अग्रणी है।सतत ऊर्जा प्रौद्योगिकी केंद्र ने जैव चिकित्सा अपशिष्ट प्रबंधन के लिए दोहरी कीटाणुशोधन-ठोसीकरण प्रणाली विकसित की है।पर्यावरण प्रौद्योगिकी प्रभाग प्रदूषकों और औद्योगिक गंधों की निगरानी करता है और उन्हें रिकॉर्ड करता है ताकि उत्सर्जन दिशा-निर्देशों को प्रभावित किया जा सके।माइक्रोबियल प्रसंस्करण तथा प्रौद्योगिकी प्रभाग जैव ईंधन और ठोस अवस्था किण्वन के लिए एंजाइम प्रौद्योगिकी विकसित करता है।सामग्री विज्ञान तथा प्रौद्योगिकी प्रभाग मुद्रित इलेक्ट्रॉनिक्स, बायोडिग्रेडेबल कंपोजिट और ऑटोमोटिव एयर कंप्रेसर के लिए उन्नत मिश्र धातुओं के क्षेत्र में अग्रणी है।

सीएसआईआर-एनआईआईएसटी ने औद्योगिक समुदाय के साथ सीधे जुड़ने और नई साझेदारियाँ बनाने के लिए 11 उद्योग-कनेक्ट कार्यक्रम आयोजित किए, जिसका उद्देश्य वैज्ञानिक और तकनीकी प्रगति को उद्योग सहित व्यापक दर्शकों तक पहुँचाना था।पारस्परिक प्रभावसे औद्योगिक जरूरतों के बारे में बहुमूल्य जानकारी मिली और कई समझौता ज्ञापनों पर हस्ताक्षर हुए। इसके अलावा, हमने वर्ष के दौरान अपने औद्योगिक ग्राहकों को प्रौद्योगिकी हस्तांतरण में उल्लेखनीय वृद्धि देखी।

मानव संसाधन एवं शैक्षणिक प्रभाग, जिज्ञासा और कौशल विकास पहल ने युवा दिमागों में वैज्ञानिक सोच को बढ़ावा देने के लिए आउटरीच कार्यक्रम चलाए हैं। सीएसआईआर-एनआईआईएसटी ने 21 अल्पकालिक पाठ्यक्रम आयोजित किए, जिससे लगभग 1100 छात्र लाभान्वित हुए।

इस पृष्ठभूमि में, वार्षिक रिपोर्ट वित्तीय वर्ष 2023-24 में सीएसआईआर-एनआईआईएसटी द्वारा प्राप्त सफलताओं, उपलब्धियों औरप्रगति को प्रदर्शित करती है, जो नवाचार के मार्ग पर प्रकाश डालती है।

Significant Achievements 2023-2024

In 2023-24, CSIR-NIIST made significant strides in science, technology, and human resource development, thanks to significant contributions from stakeholders such as central and state government agencies, educational institutions, and both public and private sectors. CSIR-NIIST's commitment to excellence is evident in its top-notch research publications, patents, and innovative research projects.

During this period, CSIR-NIIST oversaw a diverse portfolio of 181 projects funded by various agencies. Furthermore, the year saw the successful initiation of 27 CSIR projects spanning different themes under the CSIR mandate. The research output comprised 319 publications, 31 PhD theses, and a notable patent portfolio.

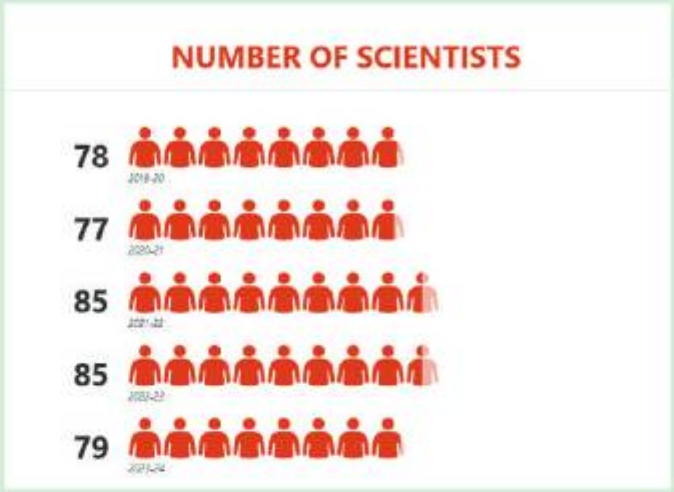
The Institute is at the forefront of innovation-driven interdisciplinary research, leading the way in addressing pressing environmental, health, and technological issues. The Agro Processing and Technology Division has developed biodegradable cutlery from agricultural biomass to address environmental concerns. The Chemical Sciences and Technology Division is at the forefront of cancer diagnostics with SERS and UV photodetection technologies. The Centre for Sustainable Energy Technologies has pioneered biomedical waste management with a dual disinfection-solidification system. The Environmental Technology Division monitors and records the pollutants and industrial odors, thus influencing emission guidelines. The Microbial Processes and Technology Division is advancing enzyme technology for biofuel and solid-state fermentation. The Materials Science and Technology Division is leading the way in printed electronics for thermal wear, biodegradable coir-geo composites, and improving automotive air compressors with advanced alloys.

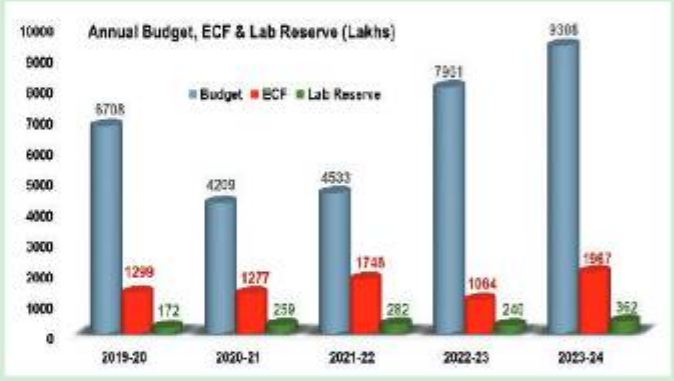
With a vision to extend the reach of our scientific and technological advancements to a broader audience, including industry, CSIR-NIIST organized 11 industry-connect programs, facilitating direct engagement with the industrial fraternity and forging new partnerships. The interactions offered valuable insights into industrial needs and have led to several MoUs and agreements. Additionally, we observed a substantial increase in the transfer of technologies to our industrial clients during the year.

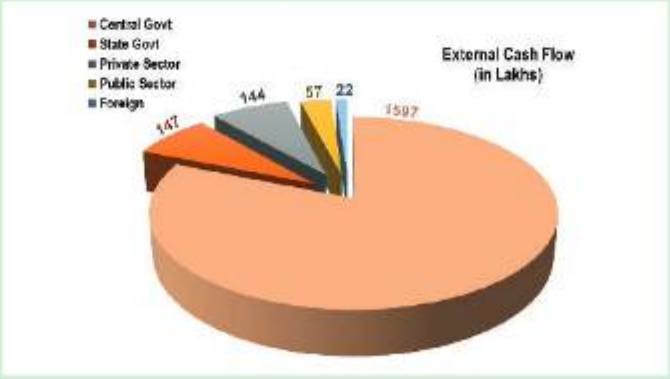
Under the auspice of the Human Resource and Academic Division, Jigyaasa, and Skill Development initiative, substantial efforts have been made to carry out outreach programs and to inculcate scientific temperament in young minds. To enhance the skills across different domains, CSIR-NIIST conducted 21 short-term courses, benefitting about 1100 students.

Against this backdrop, the Annual Report unfolds the breakthroughs, achievements, and forward leaps made by CSIR-NIIST in the fiscal year 2023-24, illuminating the path of innovation and progress.

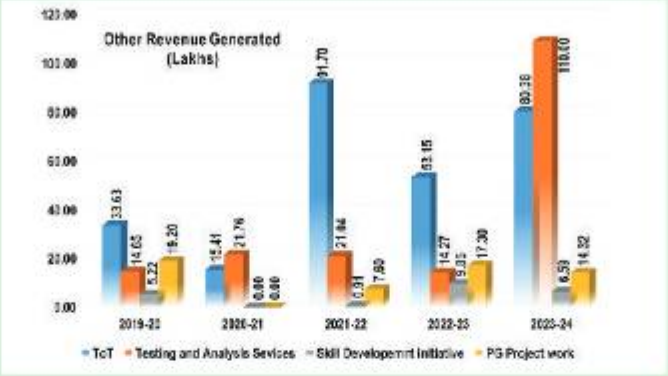
Key Performance Indicators

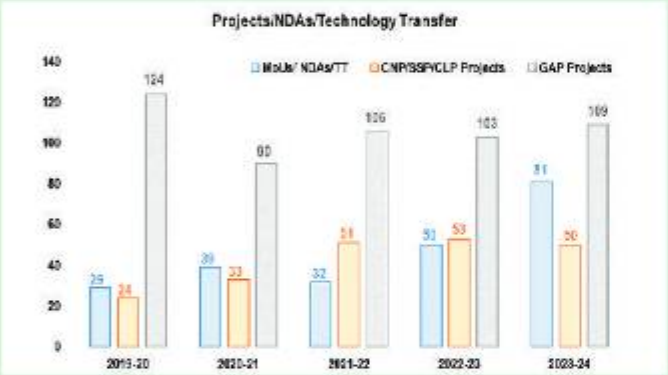


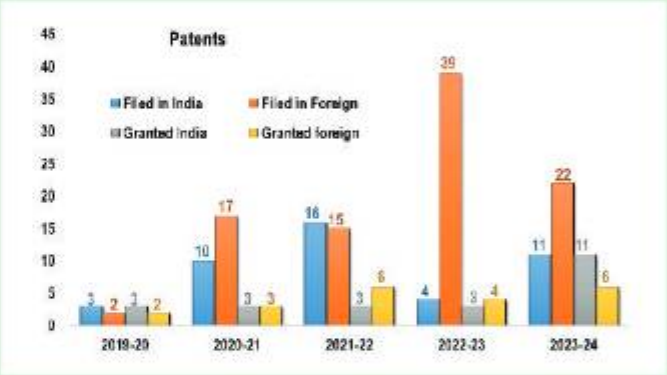


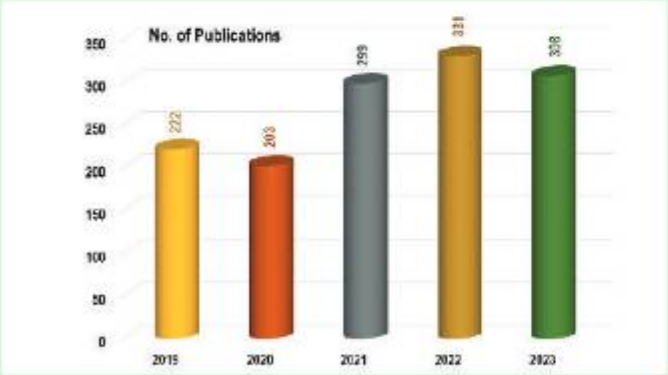


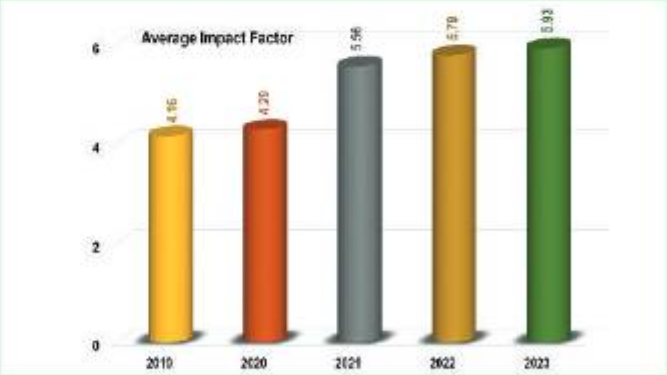
Key Performance Indicators





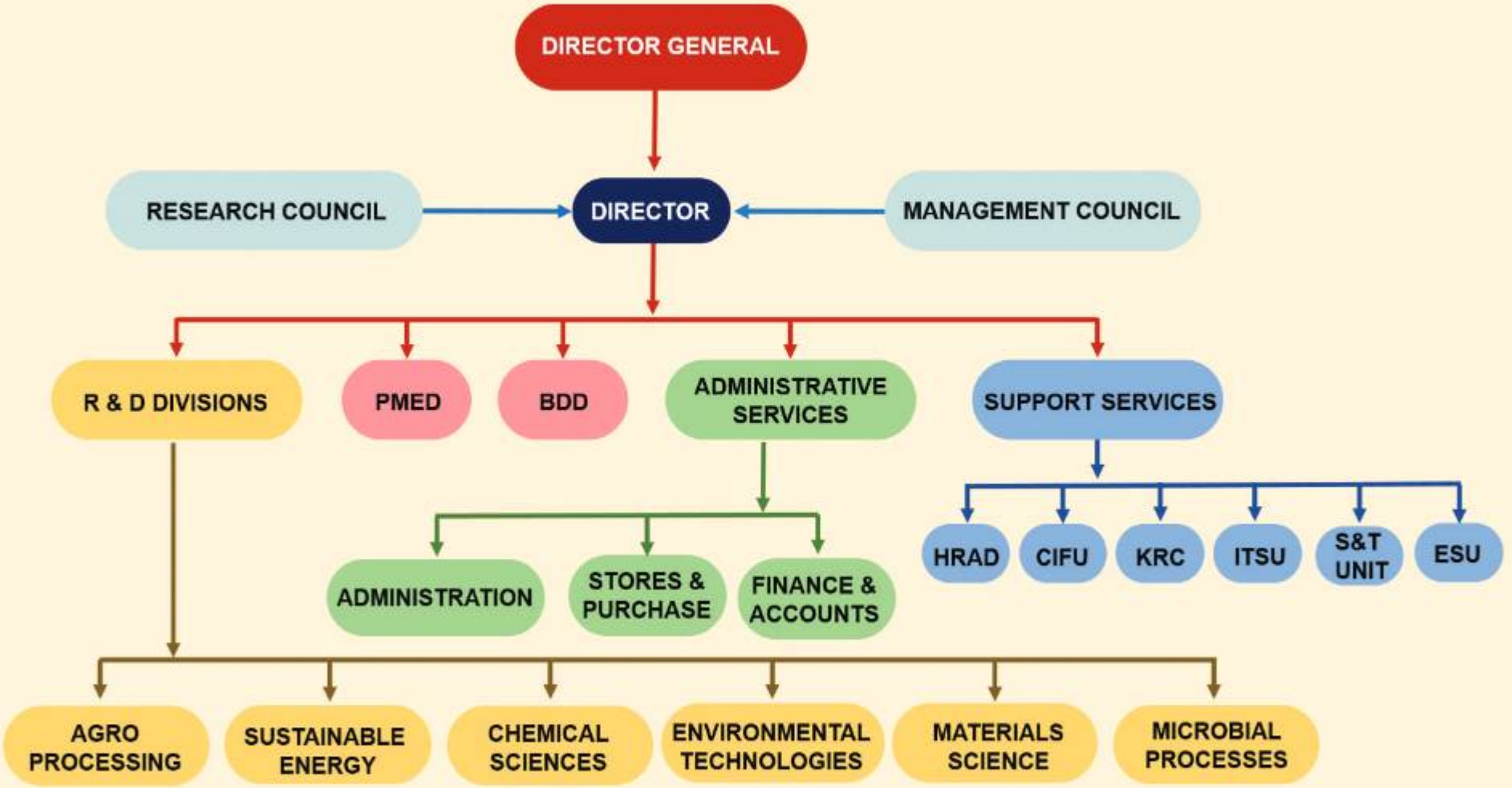






KPI

Organizational Structure



Success Stories

Success Stories

Biodegradable Cutlery from Agricultural Biomass

The pervasive use of single-use plastics has sparked major environmental crises, polluting oceans and endangering wildlife. The menace of single-use plastic cutlery exacerbates this issue due to its high littering potential, prompting global bans, including India. In response, CSIR-NIIST has forged innovative technologies using agricultural biomass—rice straw, wheat straw, coconut shells, sugarcane bagasse, and banana stems—to craft biodegradable cutlery. With plates, bowls, spoons, forks, knives, and containers, our wide range of products helps to provide a sustainable alternative. They are biodegradable, microwave-safe, and suitable for hot and cold foods. After use, they can be safely recycled as animal feed, minimizing agricultural waste. These eco-friendly solutions are poised for adoption across diverse sectors: railway stations, airports, shopping malls, IT parks, amusement parks, school and office canteens, restaurants, bakeries, street food vendors, hospitals, and tourist centers. CSIR-NIIST's biodegradable technology has made a significant commercial impact, with 21 industries adopting it nationwide. Processing plants, ranging from 500kg to 2000kg per day capacity, have been commissioned across India, facilitating successful product commercialization. These eco-friendly alternatives have garnered national acclaim and were showcased at G20 events. Adopting this affordable technology could entrust positive environmental change by providing scalable solutions that foster a circular economy and reduce reliance on non-biodegradable materials.

Plant-Based Substitutes for Animal and Synthetic Leather

CSIR-NIIST has innovated sustainable alternatives to traditional leather, addressing the environmental impacts of both animal and synthetic leather production. We have developed plant-based leather that reduces reliance on toxic chemicals and animal slaughter by utilizing agricultural residues such as sugarcane bagasse, pineapple leaves, and banana stems. This approach not only mitigates environmental harm but also repurposes agricultural waste effectively. The plant-based leather is biodegradable, cruelty-free, and suitable for diverse applications, including footwear, bags, and accessories. CSIR-NIIST has successfully transferred this technology to ten industries in India, with the first commercial plant recently commissioned in Pune. Their products, ranging from fashion items like bags, purses, and jackets to shoes and sandals, have gained recognition for their sustainability.

Aligned with initiatives like Make in India and Atmanirbhar Bharat, this innovation promotes rural development and creates employment opportunities while supporting a circular economy. By replacing traditional leather with plant-based alternatives, CSIR-NIIST champions resource efficiency and environmental sustainability.

Plant-based meat analogs

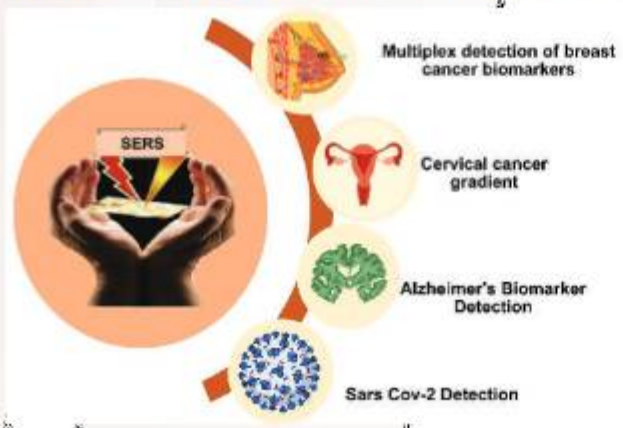
Current food production practices are largely unsustainable due to dependence on industrialized livestock farming and monocropping. Industrialized animal farming is often criticized for their land, water, and feed requirements (derived from mono-crops) and massive carbon footprint. Also, the rampant usage of antibiotics and growth promoters has raised concerns about their role in food security and safety. UN panel suggests plant-based products (meat and dairy) as potential alternatives to animal-derived meat and dairy products. An alternative and indigenous process/ technology for producing plant-based meat analogs from various plant proteins is indigenously developed. High moisture extrudates with moisture content up to 60% can be prepared with an anisotropic fibrous texture to mimic different types of animal meat structures. With the CSIR-NIIST process, it is possible to produce plant-based meat alternatives similar to a wide range of animal meat products. Moreover, the formulation requires limited additives, and the process is industrially scalable for producing low-carbon footprint alternatives to animal meat products.

Fig. (a) Cooling die setup designed at CSIR-NIIST. **(b)** High moisture extrudate based on pea protein produced at CSIR-NIIST. **(c)** Cooked plant-based meat analogs mimicking fibrous chicken meat texture.

Automated and Integrated Equipment for Converting Pathogenic Biomedical Waste into Value-added Soil Additives

Biomedical waste, which includes potentially infectious and pathogenic materials, presents a significant challenge for proper management and disposal. India produces 774 tonnes of biomedical waste daily (CPCB 2020). Improper segregation of this pathogenic waste, open dumping, open burning, and inadequate incineration lead to several issues, including releasing harmful human carcinogens, such as dioxins, furans, particulate matter, and ash residues. Increased biomedical waste generation demands more transportation facilities, increasing the risk of costly accidents and spills. Recognizing the significance of an alternative strategy for pathogenic biomedical waste disposal without the use of incinerators, we developed a dual disinfection-solidification system that can spontaneously disinfect and immobilize pathogenic biomedical waste, apart from imparting a pleasant natural fragrance to otherwise foul-smelling biomedical waste. The developed technology has also been confirmed by expert third parties for its antimicrobial action and the non-toxic nature of the treated material. Soil studies have confirmed that the treated biomedical waste is superior to organic fertilizers like vermicompost. With its potential to transform treated waste into value-added soil additives, this solution effectively addresses one of the biggest societal challenges of modern times. To achieve the target of minimal human exposure, automated equipment has been fabricated to handle and mix the materials in the right proportion. Through this technology, CSIR-NIIST aims at an innovative solution for the safe and environment-friendly management of pathogenic biomedical waste.

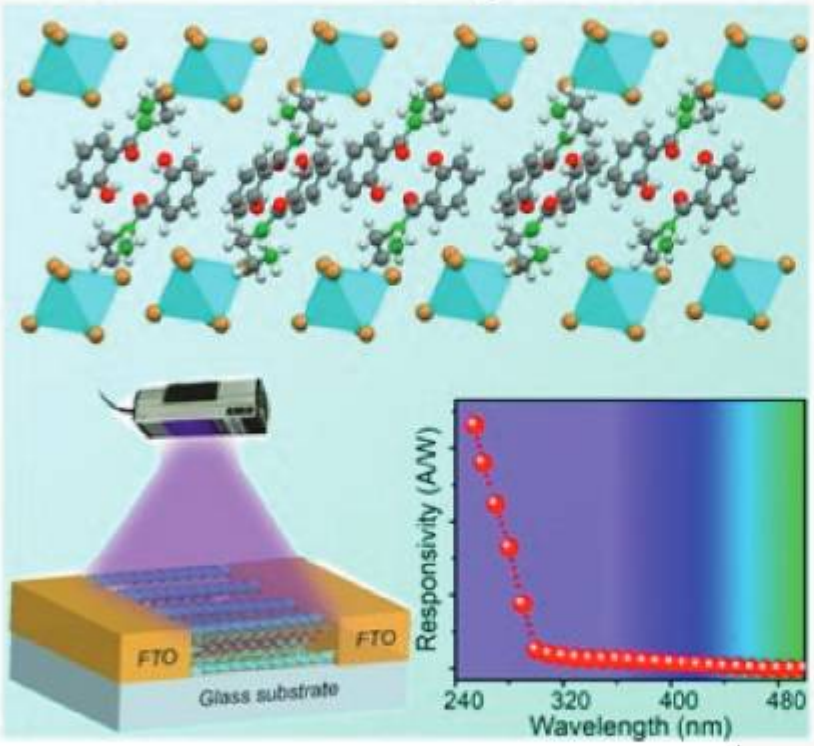
Raman Spectroscopy-based Diagnostic Platforms for Early Detection of Cancer



With nearly 10 million deaths due to cancer in 2020, it is the leading cause of death globally. Cancer's chances of survival significantly increase when it is detected in its early stages. Because early detection has the potential to lower cancer mortality, it is crucial for the treatment of appropriate cancer and its location at the earliest possible stage. For the majority of cancer forms, there are

no reliable, affordable, real-time, less invasive early screening methods. Despite many optical imaging techniques and new cytopathology techniques, getting an accurate diagnosis to date is still a prevailing challenge. To address this issue, CSIR-NIIST has been working for the past eight years to develop a diagnostic platform based on Surface Enhanced Raman Spectroscopy (SERS) and functionalized nano-particle probes for ultrasensitive detection of various human cancer biomarkers viz., cervical, breast, lung, prostate, and glioma. The major development emphasized SERS-based nanotag development for differentiation of the grades of cervical cancer from clinical samples and multiplex biomarkers in breast tissue samples, which are well recognized in CSIR Mission Mode projects in the healthcare theme. The technology has been protected by IPR, and several outstanding publications have come out in internally reputed journals in recent years. Recently, NIIST has initiated the development of a real-time Artificial Intelligence (AI) based detection technique utilizing SERS for identifying biomolecular Raman fingerprints being affected or changing their abundance during the metabolic transformation of tumor cells, which are reflected in blood. The pilot study has been completed, reflecting a high accuracy level of cancer prevalence, which urges the next phase of multicentric clinical studies. The clinical collaboration is established with Government Medical College, Trivandrum (GMCT), Adyar Cancer Institute (WIA), Chennai, and a start-up Olusium Technologies in Advanced Research Pvt. Ltd (OLTIAR), responsible for building up the AI-based technique.

Novel Tin Halide Perovskite Enables Advanced Deep-UV Photodetection



Research conducted at CSIR-NIIST has led to developing a groundbreaking material designed for next-generation ultraviolet (UV) photodetectors. This advancement is poised to drive progress in environmental monitoring, medical diagnostics, and security systems. The team successfully synthesized a zero-dimensional tin halide perovskite compound with outstanding optoelectronic properties, showcasing its potential for selective deep-UV photodetection. Notably, the material's unique quantum-well-like structure contributes to its advantageous characteristics, such as anisotropic photoconductivity and an exceptionally long charge carrier lifetime. Surprisingly, the material exhibited superior performance in its film state compared to its crystalline form. To put the material to the test, the researchers constructed a UV photodetector device, which delivered impressive results, including high responsivity, excellent detectivity, and strong external quantum efficiency – critical parameters for effective photodetection. Furthermore, the device demonstrated consistent photocurrent generation, rapid response times, and long-term stability under ambient conditions. A particularly promising feature of this photodetector is its selective response to deep-UV light at 254 nm, making it invaluable for applications requiring the detection of harmful

deep UV radiation. This breakthrough represents a significant stride in developing efficient, cost-effective materials for UV photodetection. The study underscores CSIR-NIIST's commitment to pioneering materials science and optoelectronics research. As efforts to refine this technology persist, we anticipate its seamless integration into various practical applications, aligning with our mission to translate scientific discoveries into real-world impact. The comprehensive scientific work on this achievement has been published in the prestigious international peer-reviewed journal, Adv. Funct. Mater. 2024, 34, 2304899.

Technology Transfer on Production of β-Glucosidase enzyme for biofuels and bio-refinery applications

Technology for the production of β-Glucosidase (BGL) enzyme using a solid-state fermentation process has been transferred to M/s Sarthak Metals Ltd, Nagpur, on a non-exclusive basis for a license fee of 8.85 lakhs. BGL is a key enzyme in the cellulase enzyme cocktails that hydrolyse lignocellulosic biomass to produce sugars, which in turn can be fermentatively converted to ethanol (2nd generation ethanol/biofuel), or other value-added products, including platform chemicals like succinic acid, lactic acid, etc. The BGL enzyme is tested in blends along with acid cellulase and commercial biomass hydrolyzing enzyme preparations for increasing the saccharification efficiency of the cellulase cocktails by up to 30%. The process was developed at CSIR-NIIST with funding from various CSIR projects. BGL enzyme is rare in the Indian market, and the new technology would enable the indigenization of the production of this critical enzyme, which is expected to benefit 2G ethanol bio-refineries. The transfer of this technology for commercial use assumes significance, considering the spurt in demand for cellulose cocktails due to multiple bio-refineries cleared for operation in the country. It would contribute to the ethanol blending program of the Government of India.

Self-regulating Wearable Fabric Heater-based Warm Apparel for Cold Deserts

Our team has created innovative warm apparel through printed electronics, allowing for smart and comfortable clothing suitable for cold environments. Utilizing conductive materials in ink form, we've designed printed heaters that are lightweight, flexible, and energy-efficient. These heaters are incorporated into insoles, gloves, and jackets, providing superior warmth with minimal electrical consumption. Ideal for defence personnel in cold deserts, our technology focuses on seamless integration into wearable applications, offering multifunctionality and flexibility. Our focus is on three main types of warm apparel: insoles, gloves, and jackets. The warm glove is fabricated by integrating our fabric heater with a commercially available glove, which is customized to meet the requirements of the warm glove. The warm insole combines our printed heater with

a polyurethane base and fusible interfacing fabric, ensuring both comfort and integration. Our warm jacket stands out as an exceptionally valuable product in extremely cold climates, where traditional jackets fail to maintain adequate warmth. These jackets are engineered to regulate body temperature according to user preferences without rigid components, meticulously crafted by integrating fabric heaters into commercial jacket designs.

The real and thermal images of: (a) & (b) warm gloves (c) warm insole and (d) warm jacket

Reference: Indian Patent Application No.: 202111046365

Printed Biosensor for Non-invasive Detection of Glucose in Human Sweat

Diabetes Mellitus currently imperils nearly 463 million adults around the globe and is expected to threaten 700 billion by 2045. Traditional glucose monitoring methods are invasive, requiring skin pricking which can be painful and risk infection. An alternative, non-invasive method uses human sweat, which doesn't require breaking the skin's protective barrier. The Electronics Materials and Device Group at NIIST developed an innovative all-printed flexible electrochemical sensor for this purpose. Utilizing a mixture of carbon nanotube-iron oxide nanocomposite ink, Prussian Blue, and glucose oxidase enzyme, this sensor can precisely measure glucose levels in sweat. It shows a consistent response to glucose concentrations ranging from 1 µM to 400 µM, with a detection limit of 0.38 µM and high sensitivity. Even after being stored at 4°C for 60 days, the sensor maintains excellent stability, selectivity, and reproducibility, surpassing previous models in terms of detection range, cost, manufacturing ease, and wearability, making it ideal for continuous monitoring during activities like working out.

Reference: Biosensors and Bioelectronics, **2024**, 258, 116358

Squeeze cast Aluminum alloy-based Automotive air compressor head prototype components.

Automotive air compressor head prototype components were fabricated using modified squeeze cast Aluminum (ADC3M) alloy developed by CSIR-NIIST as part of the collaborative project with ZF CVCS, Chennai. Squeeze casting is an advanced near-net shape manufacturing technology in which the metal is solidified in a closed die under high pressure, forming fine grain microstructure with almost porous free components having enhanced mechanical properties. The modified aluminum alloy in annealed condition has a high thermal conductivity of 176-181 W/mK, which enhances the heat transfer efficiency of the compressor head component. The squeeze cast modified Al alloy (ADC3M) in T6 condition provides UTS of 305 MPa, Yield strength of 237 MPa, and %Elongation of 5.2%. The static test was carried out on the test rig using the squeeze cast prototype components, which showed a 10ºC reduction in the discharged compressed air.

Reference: International Journal of Metal Casting, **2023**, 17, 2981.


Research
Programs

Agroprocessing Technology

Er. Venugopal V.V.
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Dr. Vasanth Ragavan
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Dr. Tripti Mishra
(Scientist)

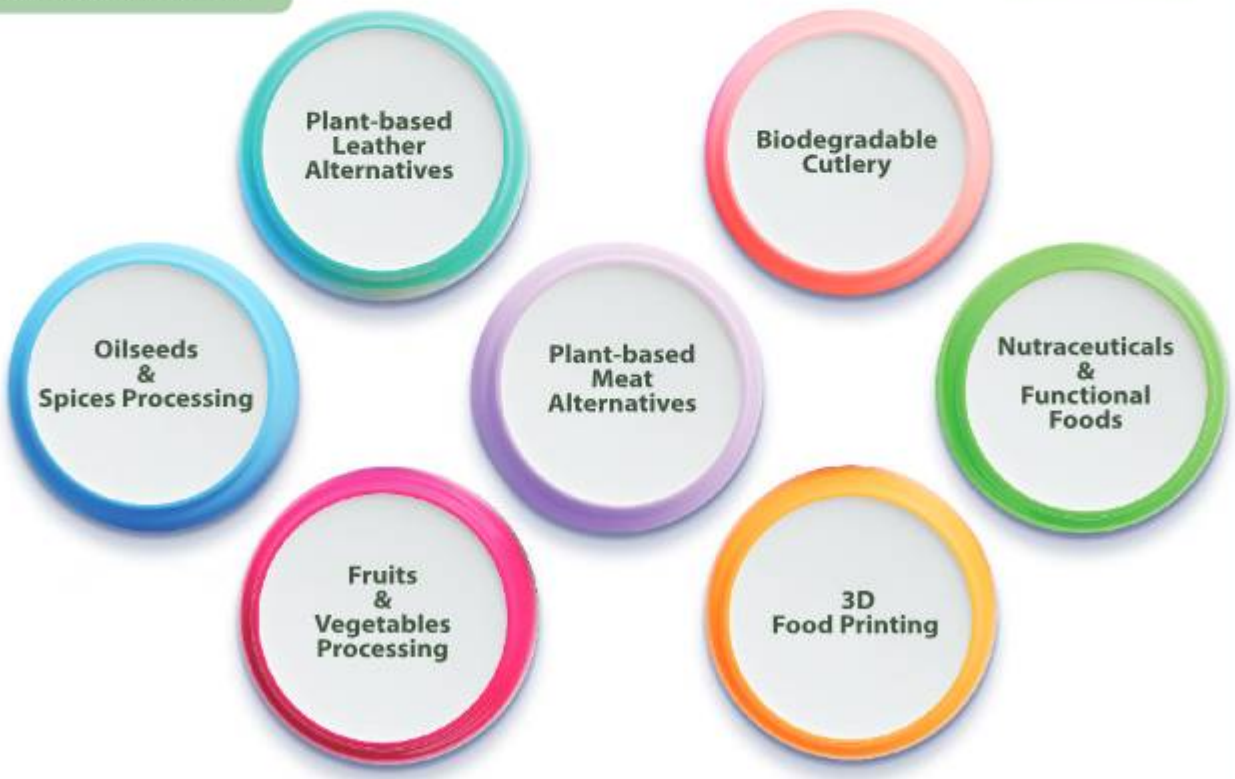
Mr. Soban Kumar D. R.
(Senior Technical Officer-2)

Mrs. Divya Mohan

Mr. Thasim J.

The division, with a team of 10 scientists, 3 technical staff, and around 40 research scholars, focuses on post-harvest technology, value addition to food and agricultural crops, functional foods, and nutraceuticals. It aims to utilize agro-waste sustainably and conducts research to combat human diseases. The division has developed technologies for processing millets, spices, oilseeds, and making value-added products. The Division has proved its core competence in waste-to-wealth transformation into fully engineered technology packages for value addition of various agriculture residues commercial exploitation by making biodegradable plates and cutleries as a substitutes for single-use plastic. The team has also commercialized plant-based leather alternatives from cactus, straw, and pseudo banana. Focusing on ready-to-eat instant food products and vegan substitutes for meat and dairy, the division collaborates with industries, helping commercialize innovations. It provides incubation services to industries and MSMEs through a pilot plant for processing agricultural crops.

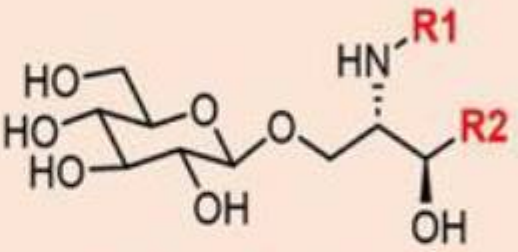
Focus Areas



First report on glucocerebrosides from unripe banana peel: its anti-inflammatory and α-glucosidase inhibition properties

Dr. Reshma, M.V.

Unripe Nendran Banana Peel



Glucocerebroside (GC)

- **First report of GC from banana peel**
- **Identified Eighteen molecular species of GC from Nendran peel**
- **GC-therapeutic potential:**
  - **Immunomodulatory functions**
  - **Anti-inflammatory properties**
  - **α-glucosidase inhibition potential**

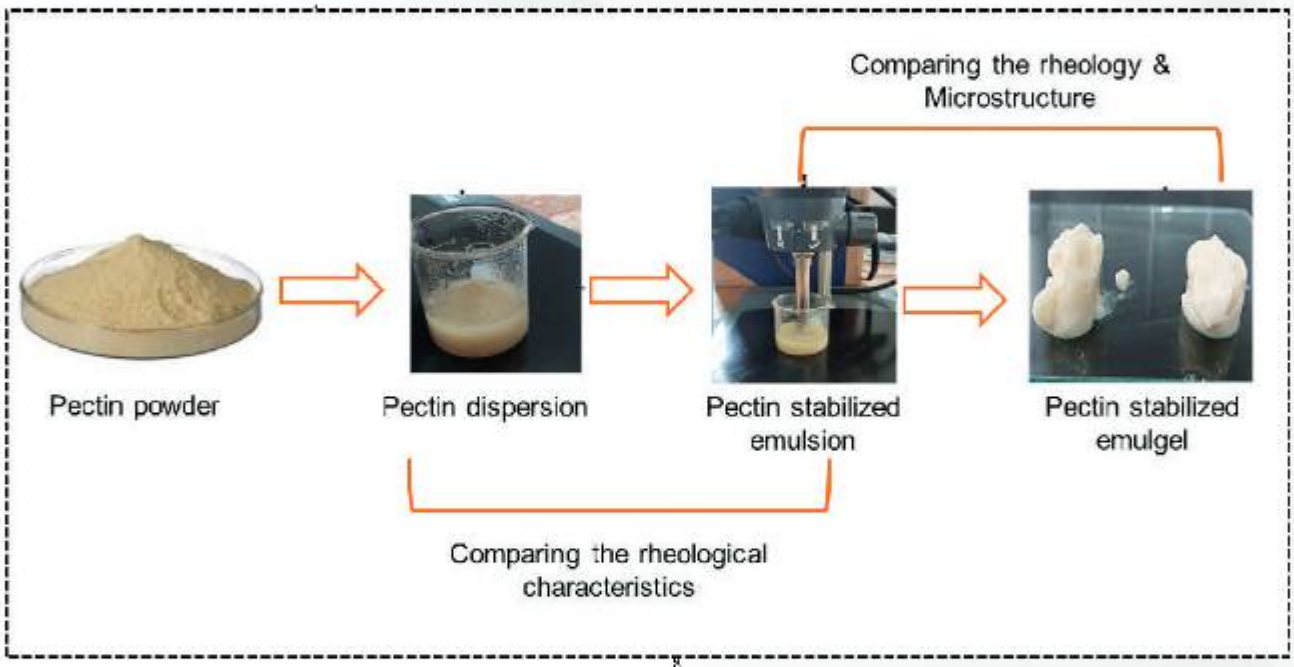
Banana peels, a major byproduct of banana processing, contain valuable compounds such as flavonols, tannins, alkaloids, terpenoids, and phenolic compounds like catechin and epicatechin. Recent studies reveal their potential for immunological modulation, anti-inflammatory effects, and diabetes management. Using high-resolution mass spectrometry, this study identifies eighteen GC molecular species with α- and ω-hydroxy fatty acids, introducing the glucocerebroside (GC) consortium from unripe banana peels (Musa AAB cv. Nendran). Tests conducted in vitro on RAW 264.7 murine macrophages demonstrated notable anti-inflammatory effects at 50 µg/mL, which decreased nitric oxide production, triggered by lipopolysaccharides. The capacity of GC to alter cytokine levels—increasing anti-inflammatory cytokines while lowering pro-inflammatory ones—was validated by the enzyme-linked immunosorbent test (ELISA). Additionally, GC showed strong inhibition of α-glucosidase (IC50 = 5.12 ± 0.51 µg/mL), outperforming acarbose (IC50 = 87.32 ± 1.99 µg/mL). This study highlights the therapeutic potential of GC by highlighting its ability to reduce inflammation and regulate diabetes.

Reference

Food Chemistry Advances **2024**, 4, 100700

Food as soft matter: Understanding the mechanism of formation of pectin-based emulgel for food applications

Dr. P. Nisha



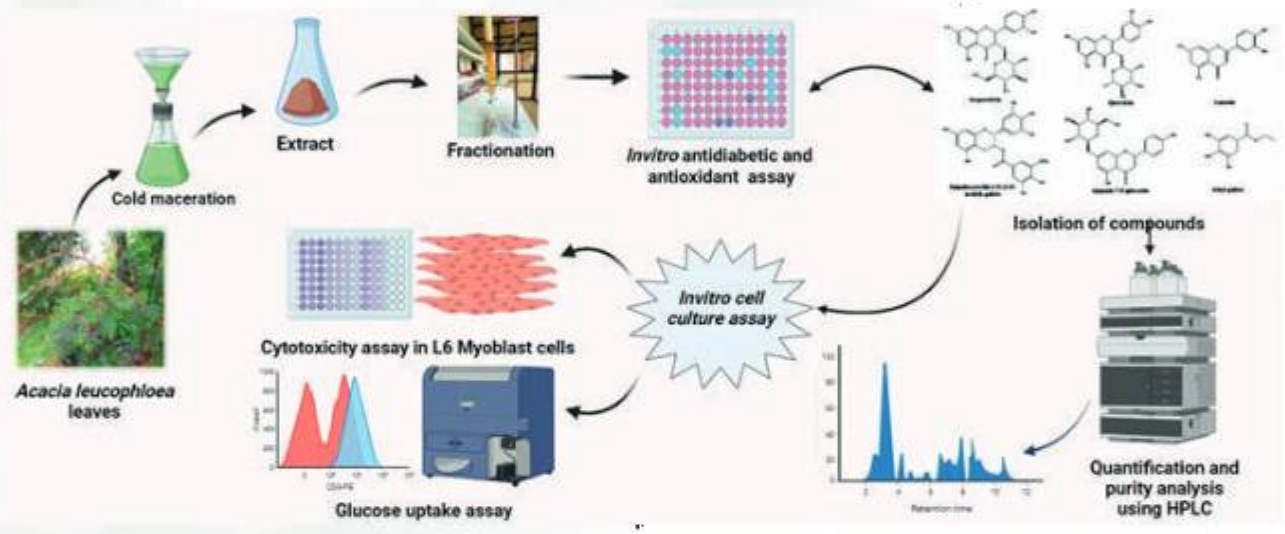
An emulsion-based method was used for developing a pectin-stabilized emulgel. The emulgel's qualities are determined by the emulsion's properties, which are impacted by the pectin that is extracted from the rind of passion fruit. This work examined the effects of pectin on the emulsion components' structural and rheological properties during the emulsion-to-emulgel transition. According to rheological studies, yield stress was found in both the emulsion and the emulgel. When the emulsion changed into an emulgel, yield stress, yield strain, and elastic modulus all increased. The microstructure investigation demonstrated that throughout the emulgel production process, droplet aggregates were formed and entrapped within the biopolymer matrix. The design of sustainable fat substitutes with desired macroscopic properties and architectures for possible commercial applications is better understood thanks to this research.

Reference

Food Hydrocolloids, **2023**, https://doi.org/10.1016/ j.foodhyd.2023.108868.

Antidiabetic investigation of traditional Indian medicinal plant

Dr. A. Kumaran



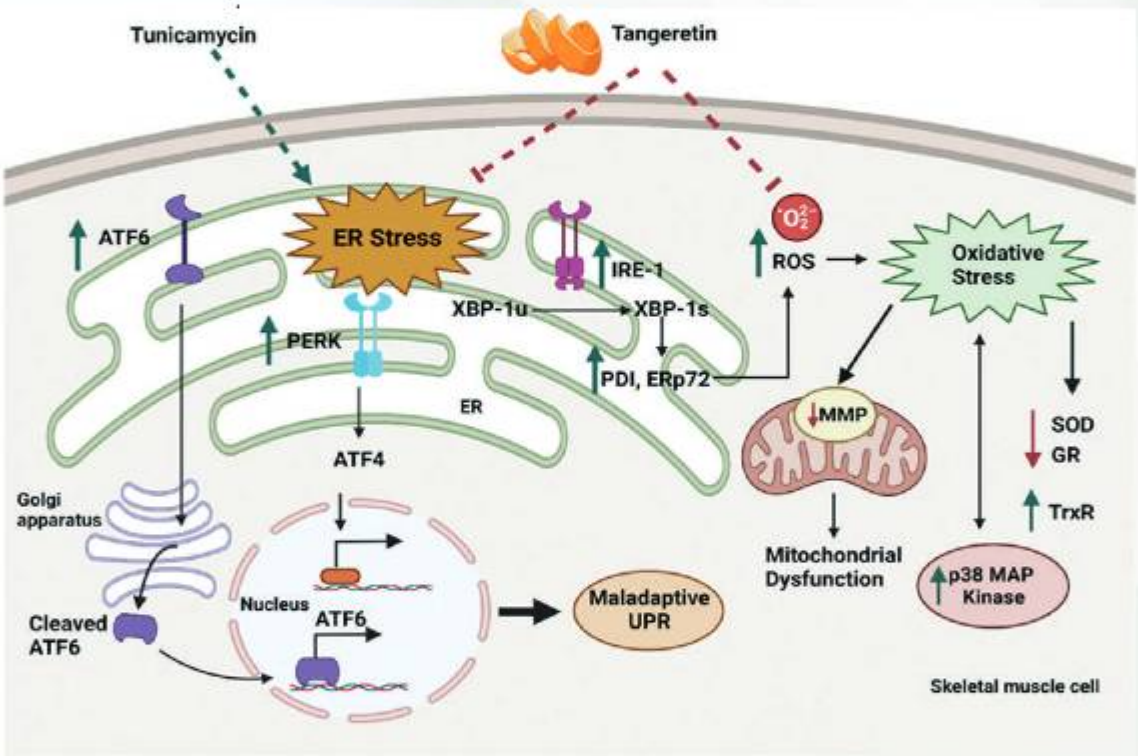
Despite the paucity of scientific data to support its antidiabetic properties, Acacia leucophloea is traditionally used to treat various illnesses, including inflammation and diabetes. In vitro, Acacia leucophloea extracts, fractions, and isolated chemicals show strong antioxidant and antidiabetic effects. The most effective fractions are those with significant phenolic and flavonoid content. It is the first time that six chemicals, including isoquercitrin and apigenin-7-O-glucoside, have been identified in this plant. These substances show promise as DPP-IV inhibitors and as enhancers of glucose absorption in L6 myotubes, indicating possible therapeutic uses.

Reference

European Journal of Integrative Medicine, **2024**, 102344.

Tangeretin alleviates tunicamycin-induced endoplasmic reticulum stress and associated complications in skeletal muscle cells

Dr. P. Jayamurthy



Skeletal muscle disorders like myositis and muscular atrophy are significantly influenced by oxidative and endoplasmic reticulum (ER) stress. Effective and less toxic, natural products are gaining interest for therapeutic uses. The study focused on methoxy flavone tangeretin, found in citrus peels, for its potential to protect against ER stress caused by tunicamycin. In experiments with rat skeletal muscle cells exposed to tunicamycin, which induces ER stress and oxidative damage, tangeretin co-treatment showed a decrease in stress indicators. It reduced cellular reactive oxygen species, improved antioxidant enzyme activity, and normalized ER function and mitochondrial membrane potential. These findings highlight tangeretin's potential as a therapy for muscle disorders related to ER stress, offering a route to more accessible and safer treatments

Reference

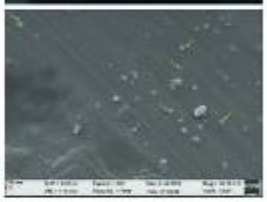
Cell Stress Chaperones **2023**, 28, 151.

Isolation and characterization of exosome-like nanoparticles (ELNs) from grapes

Dr. S. Priya







Differential centrifugation combined with ultracentrifugation

Exosome-like nanoparticles (ELNs) are membrane vesicles that resemble exosomes derived from animal cells but are nanoscale and derived from plants. They are essential for immune system control against infections and intercellular communication. Through their ability to modulate biological functions, ELNs can help treat diseases by delivering a variety of biomolecules to cells, including medicines, siRNA, DNA, and proteins. Grape exosome-like nanoparticles (GEN) are particularly noteworthy because of their ability to maintain the balance of macrophages and modulate the immune system in the colon. The best techniques for separation include ultracentrifugation, membrane filtration, and differential centrifugation; these techniques guarantee homogeneous zeta potential and PDI (Polydispersity Index). Characterization using Malvern Zeta Sizer revealed GENs with an average size of 140.8±10.75 nm. The optimized process yielded 4.8±0.509 mg protein equivalents of ELNs from 100 g of grapes, highlighting efficient extraction techniques for homogeneous GENs suitable for therapeutic applications.

Reference

SciTechnol, **2024**, 59, 365.

Pioneering sustainable alternatives: APTD's innovative research in biodegradable materials from agricultural and aquatic waste

Dr. Anjineyulu Kothakota

Limnocharis flava based secondary packaging

Seedling pots from biocomposite sheets

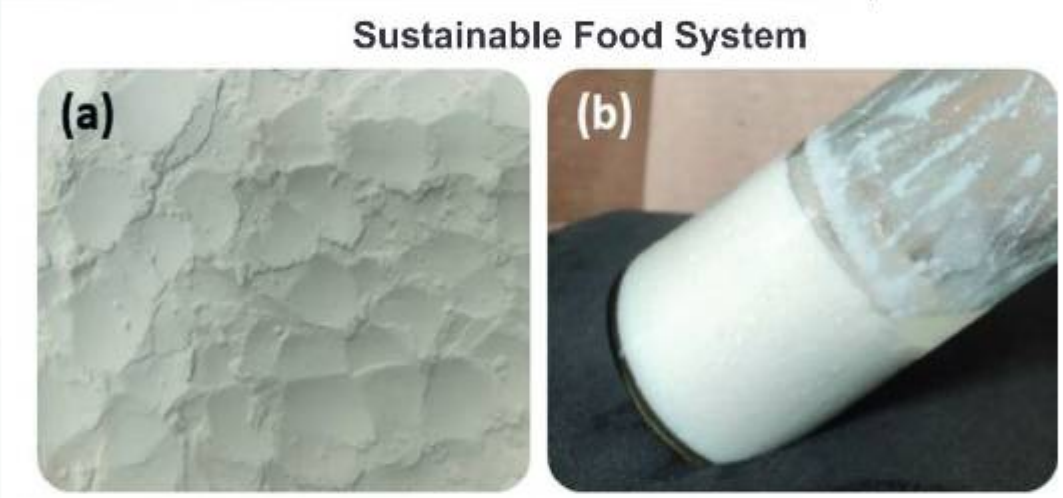
Our research is dedicated to crafting sustainable and biodegradable alternatives to traditional single-use plastics and packaging, leveraging agricultural and aquatic waste. We aim to tackle plastic pollution by repurposing biomass resources into valuable products. The research delves into creating biocomposites using natural fibers and biopolymers extracted from surplus agricultural materials and aquatic plants. It focuses on enhancing their mechanical, physical, and biodegradable attributes for various applications such as kitchenware and packaging materials. Noteworthy initiatives include developing biodegradable cutlery from plant-based micro cellulose, plates made from invasive water hyacinth, and packaging sheets derived from Limnocharisflava. Additionally, we work on biodegradable carry bags and seedling pots aimed at horticulture. The team applies numerous techniques to analyze and refine the properties of these materials, including thermal analysis and biodegradability tests, alongside investigating bio-based coatings like epoxidized castor oil to improve performance. This research underscores a significant stride towards sustainable material science, highlighting innovative methods to mitigate plastic waste and valorize biomass waste, steering towards eco-friendly practices in packaging, food service, and horticulture.

References

1. Industrial Crops and Products, **2023**, 205, 117526.
2. Food Packaging and Shelf Life, **2023**, 40, 101211.

Sustainable and plant-based foods

Dr. K. Vasanth Ragavan



(a) Upcycled protein-rich ingredient from industry byproduct.

(b) Plant-based set type yogurt from upcycled ingredient.

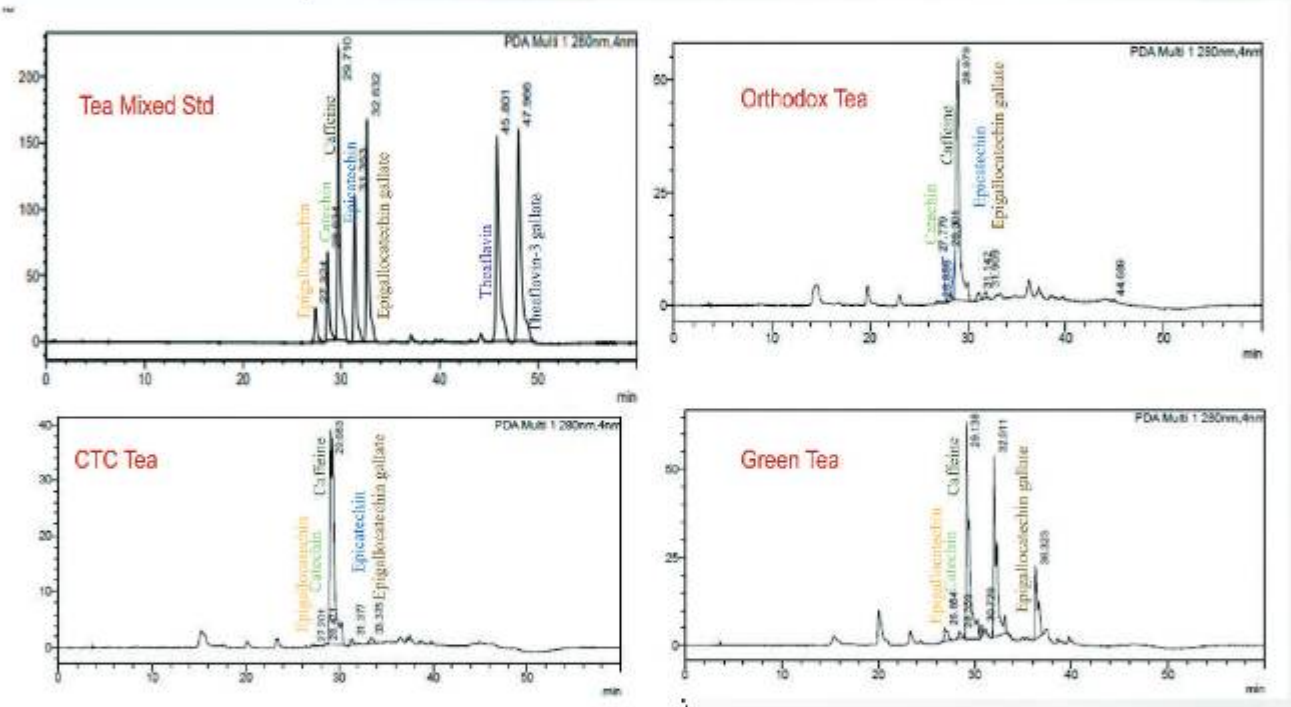
Sustainable food production systems are the need of the hour to ensure the food and nutritional security of the burgeoning global human population in the coming years. Among the approaches implemented in the food system are reducing industrialized livestock production and diversifying food sources instead of mono-crops. Plant proteins are supposed to play a greater role in ensuring food and nutritional security. However, replacing animal proteins in food products is a critical challenge due to plant proteins' limited functional and physico-chemical properties and other macromolecules such as starch.Plant proteins and starch's structure and side chains are modified through physical, chemical, and biological methods to replace animal proteins. At CSIR-NIIST, we have phosphorylated corn starch and evaluated its techno-functional properties for replacing soy protein isolate in producing high-moisture meat analogs (HMMA). Phosphorylated corn starch can replace 20% of soy protein isolate without impacting the anisotropic fibrous nature of the plant-based meat analogs.

Reference

Compr. Rev. Food Sci. Food Saf. **2023**, 22, 473.

Comparative studies on the antioxidant, anticancer, and anti-inflammatory activities of green tea, orthodox black tea, and CTC black tea

Dr. Tripti Mishra



Tea, a naturally occurring dietary supplement rich in polyphenols, varies in polyphenol content based on how it is made. Using 50:50 ethanol extracts, we investigated the antioxidant, anticancer, and anti-inflammatory properties of CTC black tea (cBT), orthodox black tea (oBT), and green tea (GT). Compared to oBT and cBT, GT demonstrated greater total antioxidant capacity, total polyphenol content, and free radical scavenging activity. According to HPLC profiling, GT has a higher concentration of polyphenols, including epicatechin, epigallocatechin, and epigallocatechin-gallate. Compared to oBT and cBT, GT showed more substantial anticancer potential in breast cancer MDA MB-231 cells, as evidenced by its increased ability to limit cell proliferation. By considerably lowering iNOS generation, ROS levels, and pro-inflammatory cytokines (MCP-1, IL-1α, and IL-6) in LPS-stimulated RAW264.7 macrophages, GT demonstrated higher anti-inflammatory effects than the other teas.

Reference

Journal of Food Science and Technology, **2023**, 10.1007/s13197-023-05900-2

Ash gourd (benincasa hispida (thunb.) cogn.) juice as an α-glucosidase inhibitor and its spray-dried juice properties

Dr. Reshma M. V.

Ash gourd (AG) is prized for its ability to prevent diabetes and obesity. α-glucosidase inhibition was examined in AG pulp juice in this investigation. The findings indicated that AG juice inhibited α-glucosidase between 0.46±0.00 and 1.61±0.00 mg/mL, while acarbose, the usual medication, inhibited the enzyme at 0.17±0.56 mg/mL. This suggests that the phytochemicals in AG juice function as α-glucosidase inhibitors. The spray-dried AG juice powder, including gum arabic (GA) and maltodextrin (MD) as anti-caking agents, was also investigated in this work. The powder that was spray-dried managed to maintain its α-glucosidase inhibition. When AG juice was mixed with MD, the powder displayed positive qualities, and when AG juice was combined with GA, the α-glucosidase inhibition was increased. The overall polyphenol (19.15±2.03 mgGAE/g) and flavonoid (16.71±1.5 mgQE/g) contents were higher in the GA powder

Reference

Journal of Food Measurement and Characterization, **2024**, 18, 2598.

Sustainable Energy

Dr. Narayanan Unni K.N.
(Senior Principal Scientist & Head)

Dr. Biswapriya Deb
(Senior Principal Scientist)

Dr. Satyajit Shukla V.
(Senior Principal Scientist)

Dr. Rakhi R. B.
(Principal Scientist)

Dr. Nishanth K.G.
(Principal Scientist)

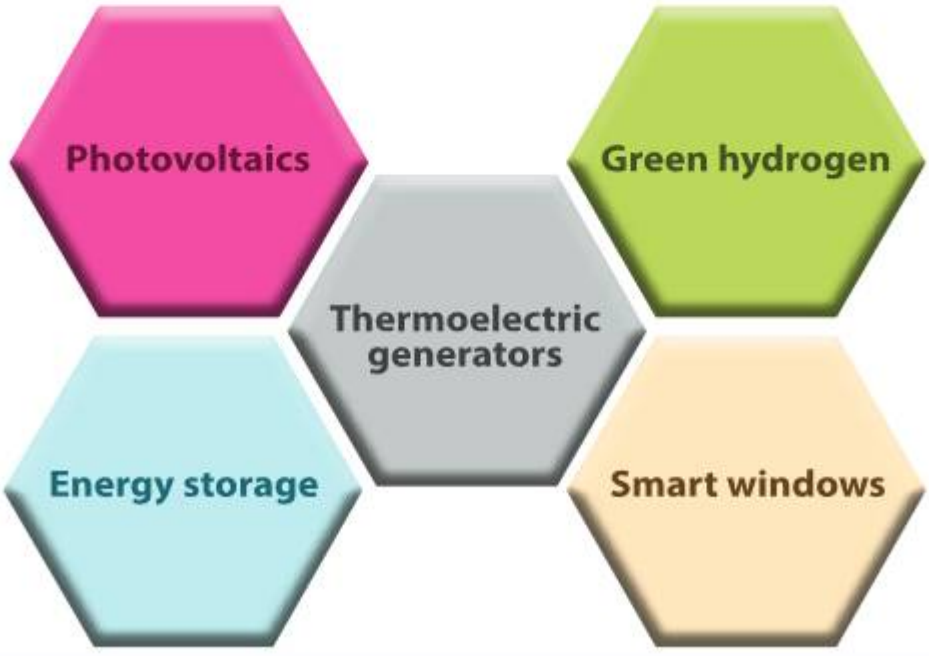
Dr. Sreejith Shankar P.
(Senior Scientist)

Dr. Suraj Soman
(Senior Scientist)

Dr. Adersh Asok
(Scientist)

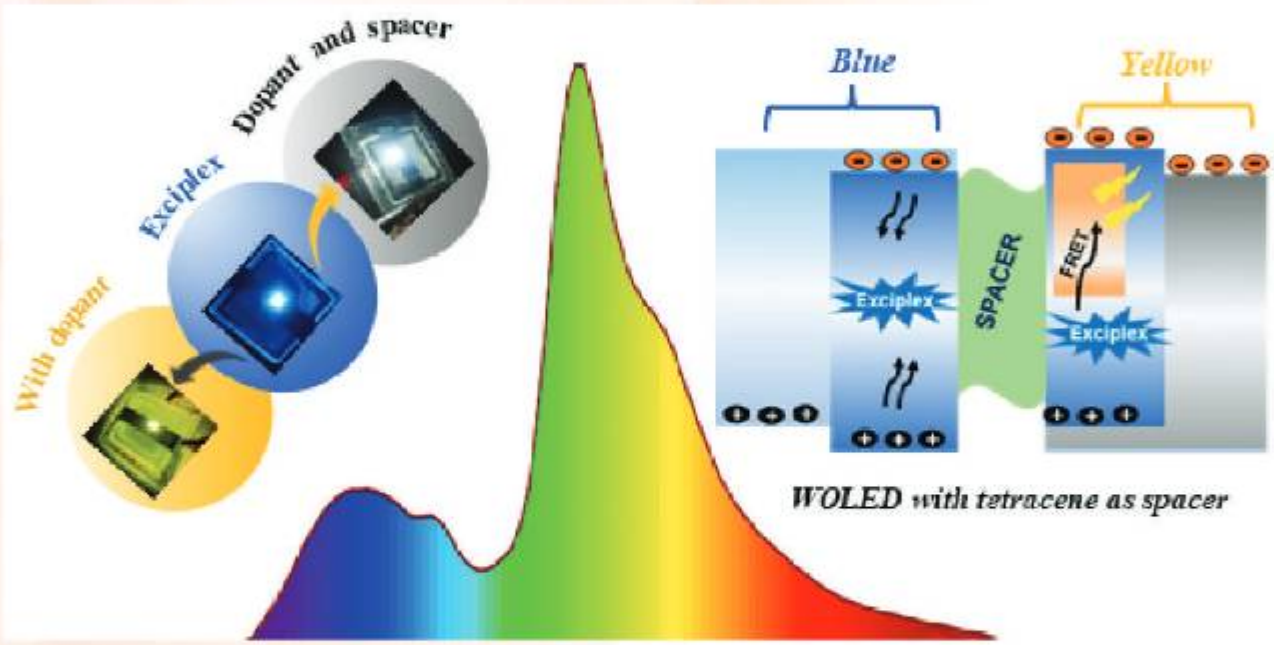
The Centre for Sustainable Energy Technologies (C-SET) at CSIR-NIIST was inaugurated by Dr. V. K. Saraswat Hon. Member of NITI Aayog on July 28, 2023. As the newest R&D division, C-SET aims to unify all energy-related activities. With a focus on energy generation, storage, conversion, conservation, and management, the Centre boasts a team of 8 scientists and 48 temporary research staff, including Ph.D. students and project associates. Research areas include solar cells, thermoelectric generators, smart windows, agrivoltaics, supercapacitors, batteries, fuel cells, green hydrogen, and textile wastewater treatment, emphasizing the development of an indigenous supply chain for materials and equipment. In 2023-24, the division managed 13 Grant-in-aid government-funded projects, 10 CSIR projects, three industry-sponsored projects, and three in-house R&D projects, and collaborated with notable industries like GAIL, Tata Motors, and Saint Gobain, as well as international partners such as SUPSI, Switzerland, and LRCS-CNRS, France. Also, we have collaboration with govt. agencies/departments such as DST, SERB, MeitY, ANERT, DMRL, and BRNS. The division is committed to fostering advancements across a wide spectrum of energy sectors, demonstrating a strong focus on innovation and collaboration with both industry and government partners.

Focus Areas



Blue emitting exciplex for yellow and white organic light-emitting diodes

Dr. K. N. Narayanan Unni



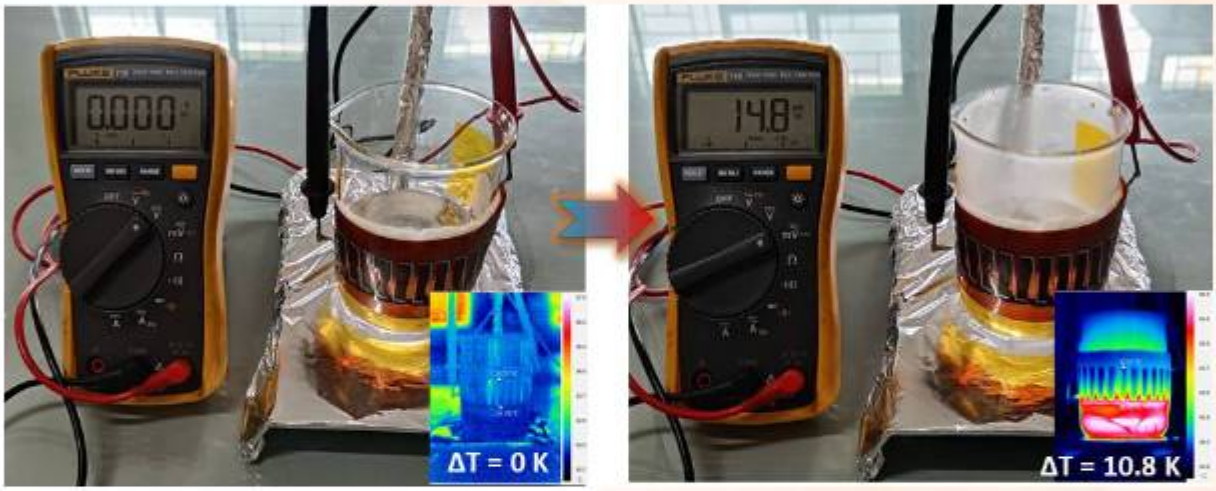
The commercialization of white organic light-emitting diodes (WOLEDs) faces challenges due to the instability of blue light emitters and high production costs. We focused on a standard blue emitting hole transporting material (HTM) N,N'-bis(naphthalen-1-yl)-N,N'-bis(phenyl) benzidine (NPB) and its exciplex emission upon combining with a suitable electron transporting material (ETM), 3-(biphenyl-4-yl)-5-(4- tert-butylphenyl)-4-phenyl-4H-1,2,4-triazole (TAZ). Blue and yellow OLEDs with simple device structures are developed by using a blend layer, NPB:TAZ, as a blue emitter as well as a host for yellow phosphorescent dopant iridium (III) bis(4- phenylthieno[3,2-c]pyridinato-N,C2')acetylacetonate (PO-01). Incorporating tetracene(having ambipolar charge transport properties) as a spacer layer in the device architecture enhances charge transport and prevents exciton diffusion, enabling improved white light emission with color properties close to daylight, achieving CIE coordinates (0.36, 0.39) and a color temperature of 4643 K.

Reference

Frontiers of Optoelectronics **2023**, 16, 46

Components for the thermoelectric materials and smart window development

Dr. Biswapriya Deb



Organic materials have substantially influenced thermoelectric technology in flexible electronics. The optimization of these materials in flexible devices necessitates a more profound comprehension and fine-tuning of the device parameters. We achieve exceptional bonding and improve the efficiency of flexible organic thermoelectric generators (f-OTEGs) by employing dispenser printing to deposit an organic composite of conjugated thienothiophene polymer and SWCNT on a polyimide substrate. In particular, a 7-legged f-OTEG exhibited high efficiency by generating 95 nW of power with a 69.1 K temperature differential, demonstrating no degradation over 200 days, stability beyond 200 hours, and enduring over 500 bending cycles without a loss in performance. We devised a biodegradable electrolyte for electrochromic devices using water hyacinth (Eichhorniacrassipes) extract. A preexisting method for active electrode fabrication was employed to deposit nanocrystalline orthorhombic WO3 on FTO plates. The water hyacinth extract was used as the electrolyte without any modifications, resulting in electrochromic systems that exhibited exceptional cycle stability for 16000 seconds throughout the voltage sweep. The cyclic stability and charge storage of WO3 electrodes were improved without compromising electrochromic performance by depositing MnO2 over amorphous and crystalline WO3 thin films to create electrochromic bilayers.

Reference

Materials Today Energy, **2023**, 101233

Development of ozonation-based continuous reactor for replacement of stage-I facility of CETP at KINFRA

Dr. Satyajit V. Shukla

- Reactor Volume = 1 L
- Hydraulic Retention Time = 20 min
- Output = 5 L
- Reaction Time = 1 hour 40 min

The Common Effluent Treatment Plant (CETP) of Kerala Industrial Infrastructure Development Corporation (KINFRA) utilizes Stage-I and Stage-II facilities for the treatment of textile effluents having the initial chemical oxygen demand (COD) levels in the range of 1,000-5,000 mg L-1. The Stage-I facility comprises physical, chemical, and biological processes, while the Stage-II facility consists of membrane-based ultrafiltration, microfiltration, reverse osmosis (RO), and multiple effect evaporators. After the treatments with the Stage-I facility, the COD level is reduced below 150 mg L-1; after the Stage-II treatment, it is reduced to almost zero. Nevertheless, the CETP generates 80-100 kg of solid sludge per day after the Stage-I treatment via the chemical and biological processes that create handling, storage, transport, disposal, and reuse issues. Under the recently concluded DST-TMD(OWUIS) funded project, CSIR-NIIST developed an Ozonation-based continuous reactor that can treat the textile effluents, containing the azo reactive dyes and having an initial COD level of 670 mg L-1, which can decolorize the effluent and reduce an initial COD level below 150 mg L-1 without any generation of solid sludge. The proof-of-concept was obtained using the static (100 ml capacity) and continuous reactors (1 L capacity).

Reference

Chemosphere, **2024**, 349, 14076.
Environ. Sci. Pollut. Res., **2023**, 30, 29258.

Design and development of nanostructured electrode materials for electrochemical applications

Dr. Rakhi R. B.

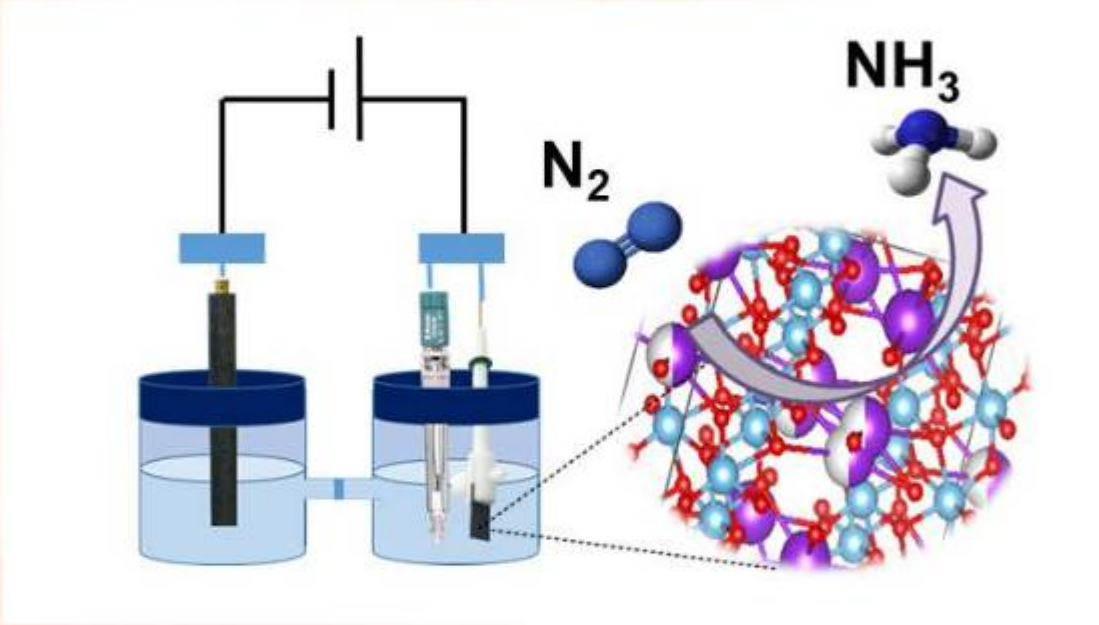
Nanostructured materials offer high surface area, enhanced electrical conductivity, and improved electrochemical reactivity, making them ideal for energy storage in supercapacitors and batteries. By engineering electrode materials at the nanoscale, researchers enhance charge storage capacity, cycling stability, and power density, which is crucial for advancing energy storage technologies. Similarly, nanostructured electrodes enable sensitive and selective detection of analytes in electrochemical sensing applications, contributing to advancements in healthcare, environmental monitoring, and food safety. Moreover, nanostructured materials serve as efficient electrocatalysts for the hydrogen evolution reaction (HER), a critical step in water splitting for hydrogen production. By tailoring nanostructured electrocatalysts' composition, morphology, and surface properties, researchers strive to improve HER efficiency, facilitating the transition towards sustainable energy systems. Various nanomaterials like nanocarbons, transition metal oxides, and MXenes are used as electrode materials, driving innovation in electrochemical technologies. Overall, research in this multidisciplinary domain drives innovation, addressing pressing global challenges and paving the way for next-generation electrochemical technologies.

Reference

J. Energy Storage, **2024**, 88, 111505.
ACS Omega, **2023**, 8, 8695.

Electrode materials for green ammonia synthesis

Dr. Nishanth K. G.



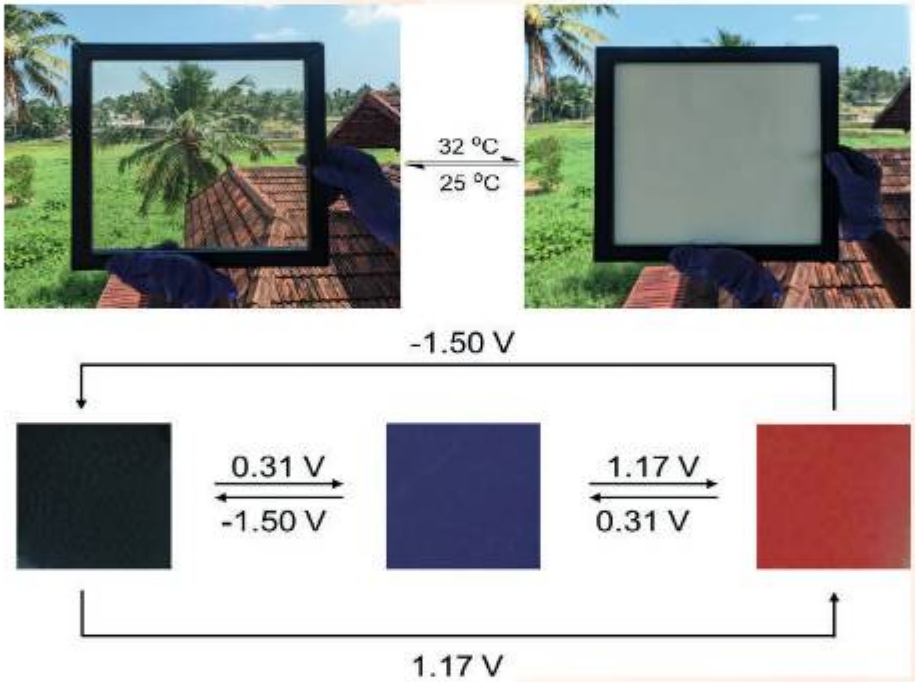
The production of ammonia worldwide currently relies on fossil fuels and is associated with significant greenhouse gas emissions. There is a growing demand to replace fossil fuel-based ammonia with green or carbon-free alternatives due to its use in fertilizer, as a carbon-free fuel for the maritime sector, and as a hydrogen vector. Conventional ammonia production through the Haber-Bosch process is energy-intensive (consumes 1-2% of total energy worldwide) with heavy CO2 emissions (releases ~420 Mt of CO2 annually). Electrochemical ammonia synthesis under ambient conditions has gained attention due to its eco-friendly nature, lower energy consumption, ambient operation conditions, and cost-effectiveness compared to the conventional process. At CSIR-NIIST, we focus on developing suitable electro-catalysts for green ammonia and urea synthesis.

Reference

ACS Appl. Nano Mater., **2024**,7, 4199.
Sust. Energy & Fuels, **2022**, 6, 1519.

Smart materials and devices for sustainable and societal technologies

Dr. Sreejith Shankar P.



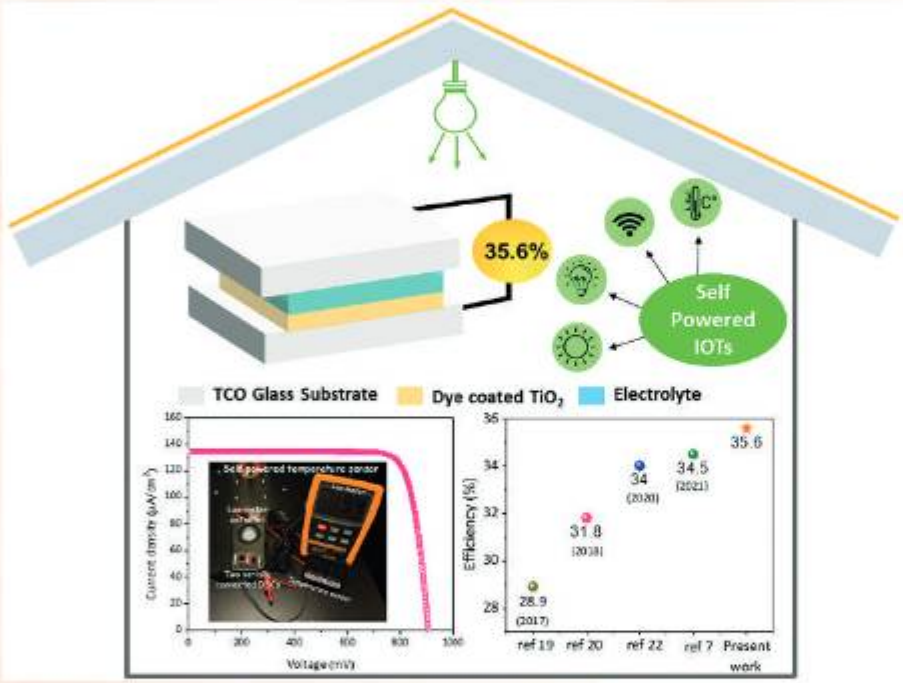
Smart materials and their applications are among the best solutions for several modern-day challenges toward sustainability. A smart material changes its properties in response to an applied stimulus all by itself. Such changes in properties are usually reversible and can be effected by applying an external stimulus such as temperature, electricity, stress, etc. The applications of smart materials range from color-changing photochromic glasses in response to light to electrically stimulated electrochromic windows on Boeing Dreamliner and shape memory alloys that remember their original shape even after mechanical deformation. Our research focuses on the smart attributes of chemical systems in terms of stimuli-responsive color changes, electro and thermoresponsive smart fenestration (bright windows), and non-wetting behavior for energy saving and storage applications. We integrate these systems with solar PV for a comprehensive building solution.

Reference

J. Mater. Chem. A, **2023**, 11, 26340.
Mater. Advances, **2023**, 4, 6213.

Molecular light harvesters for indoor photovoltaics

Dr. Suraj Soman



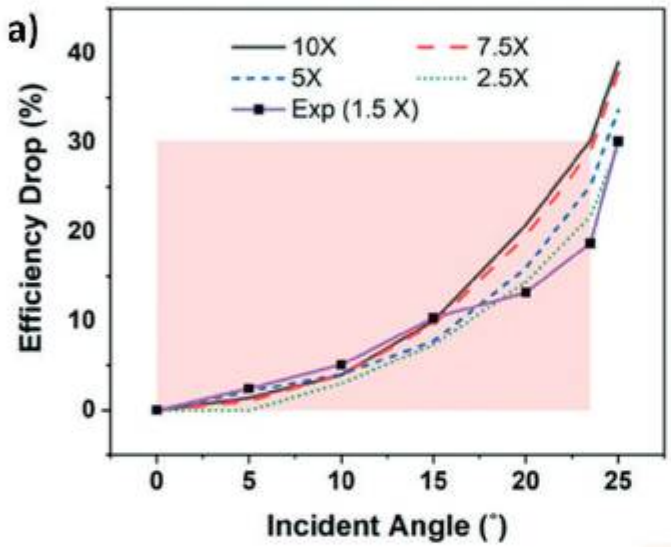
Nature employs photo synthesis to capture and convert light to energy. Within the realm of third-generation light-harvesting technology, our research focuses on advancing third-generation light-harvesting technology, particularly dye-sensitized solar cells (DSCs) and perovskite solar cells (PSCs), aiming for efficient energy capture across indoor, ambient, and outdoor light settings. To create self-powered products, we develop indoor-specific DSCs using alternative copper electrolytes and co-sensitized organic dyes. Our work has led to a breakthrough in photovoltaic performance, achieving a record 35.6% power conversion efficiency under 1000 lux standard indoor illumination and a record 1.27 V voltage for single-junction DSCs. This is achieved through optimizing the semiconductor layer and innovatively controlling recombination with dual-species copper electrolytes. The unique semi-transparent nature and color versatility of DSCs pave the way for creative applications, such as integration within glass facades and architectural designs, offering significant potential for future indoor space enhancements.

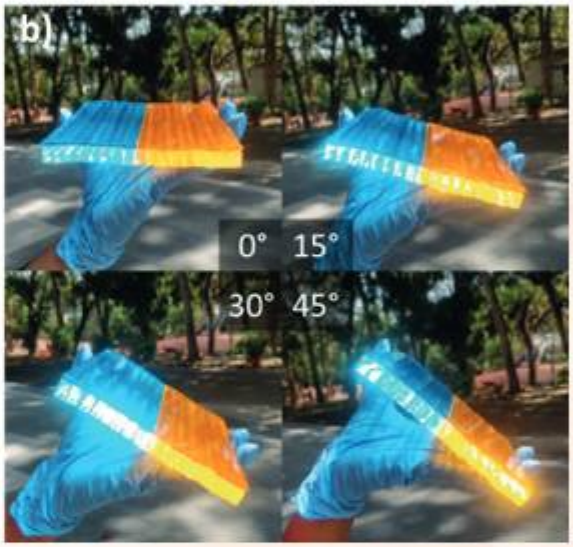
Reference

Journal of Materials Chemistry A, **2024**, 12, 1081.
Journal of Materials Chemistry A, **2023**, 11, 14748.

Skewed V-groove-based low-concentration solar optics

Dr. Adersh Asok



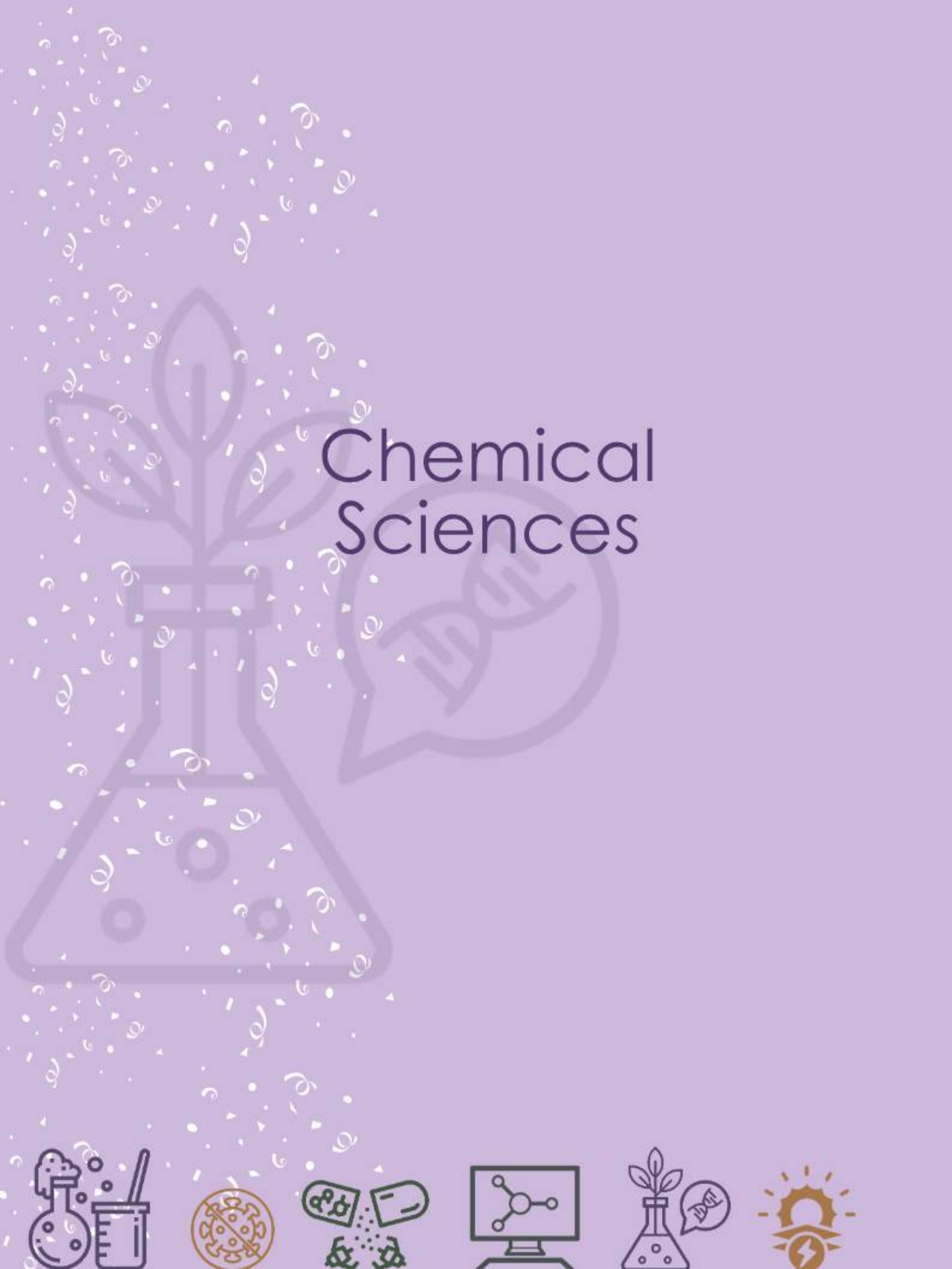


Low-concentration photovoltaic (LCPV) systems stand out for their balanced performance in the pursuit of efficient and adaptable solar energy solutions. These systems offer a practical balance between high-concentration photovoltaics and traditional solar panels. We have developed a new skew V-groove design for Planar Light Concentrators (PLCs). It simplifies production using a single-element method and minimizes the need for precise optical alignment thanks to its non-sequential optic approach. Our skew V-groove-based PLCs are ideal for LCPVs under a 10X geometric concentration. Versatile for both indoor and outdoor use, they're perfect for everything from solar-equipped furniture to large-scale building-integrated photovoltaics and LCPV-based utility power plants.

Reference

Results Eng., **2022**, 16, 100665.
Patent Filed: Application No. 202311075871; Filed on 6th November 2023.

Chemical Sciences



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Mr. Kiran Mohan
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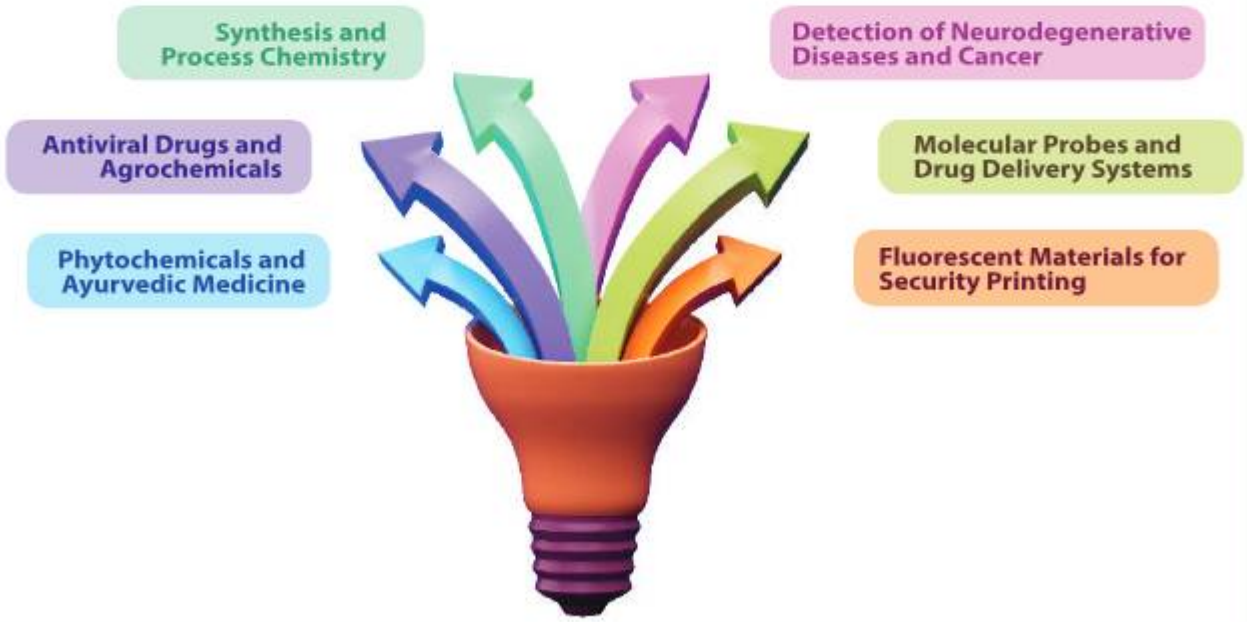
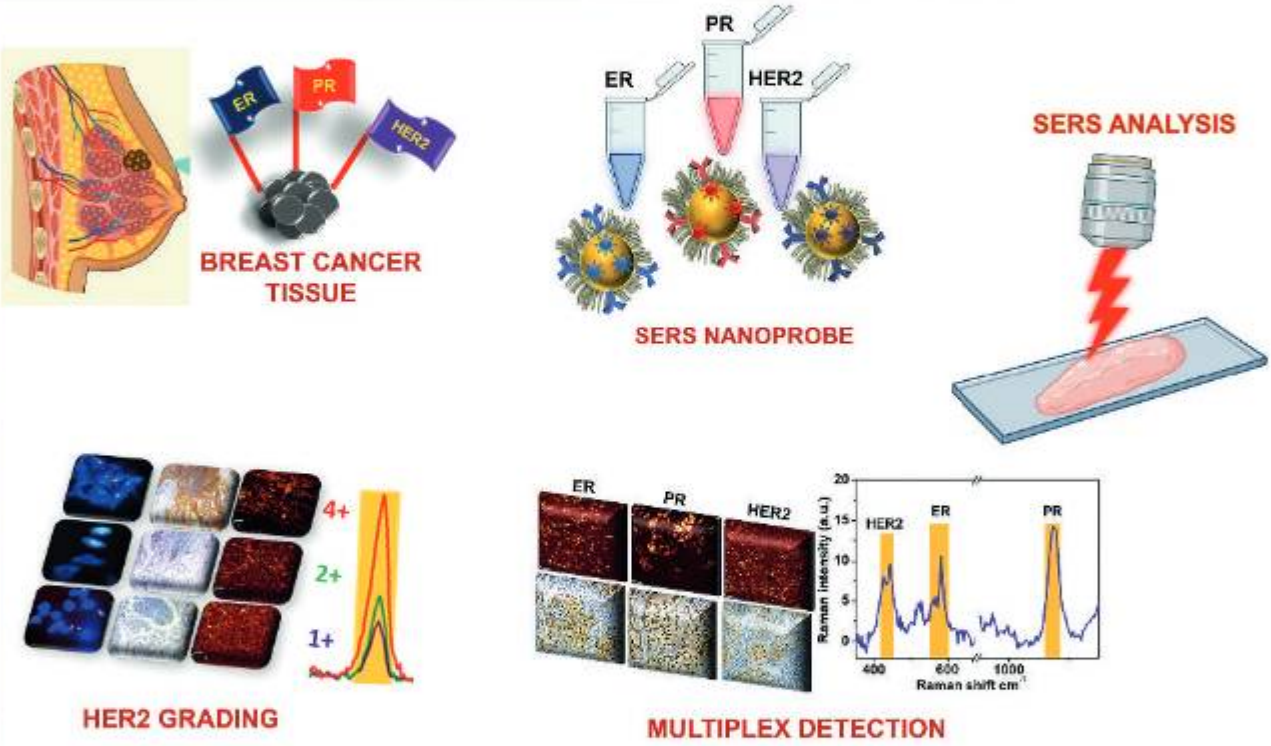
The Chemical Science and Technology Division (CSTD) at CSIR-NIIST, enriched with 13 scientists, four technical officers, and 73 research scholars, aims to bolster its global standing and societal impact through cutting-edge interdisciplinary research. Also, we focus on developing high-end technologies to support an innovation-driven industry, with special emphasis on active pharmaceutical ingredients, preformulation, and formulation of pharmaceuticals, agrochemicals, and specialty chemicals. Our activities span various areas such as synthetic organic chemistry, catalysis, nucleoside and nucleotide chemistry, diagnostics, and theranostics, functional and smart materials, photophysics, and supramolecular chemistry. We innovate in drug delivery, using nano-carriers for targeted therapy against cancer and other diseases. We leverage the region's plant and herbal wealth to uncover new bioactive compounds, drawing insights from Ayurveda, Siddha, and tribal medicine. Our vision aligns with the overarching themes of CSIR—Chemical (including Leather) and Petrochemicals (CLP), Energy (conventional and non-conventional) and Energy Devices (EED), Agri, Nutrition, and Biotech (ANB), Mining, Minerals, Metals and Materials (4M), and Molecules and Nanomaterials for Diagnostics in Healthcare (HTC).

Focus Areas



A clinically feasible diagnostic spectro-histology built on SERS-nanotags for multiplex detection and grading of breast cancer biomarkers

Dr. Kaustabh Kumar Maiti



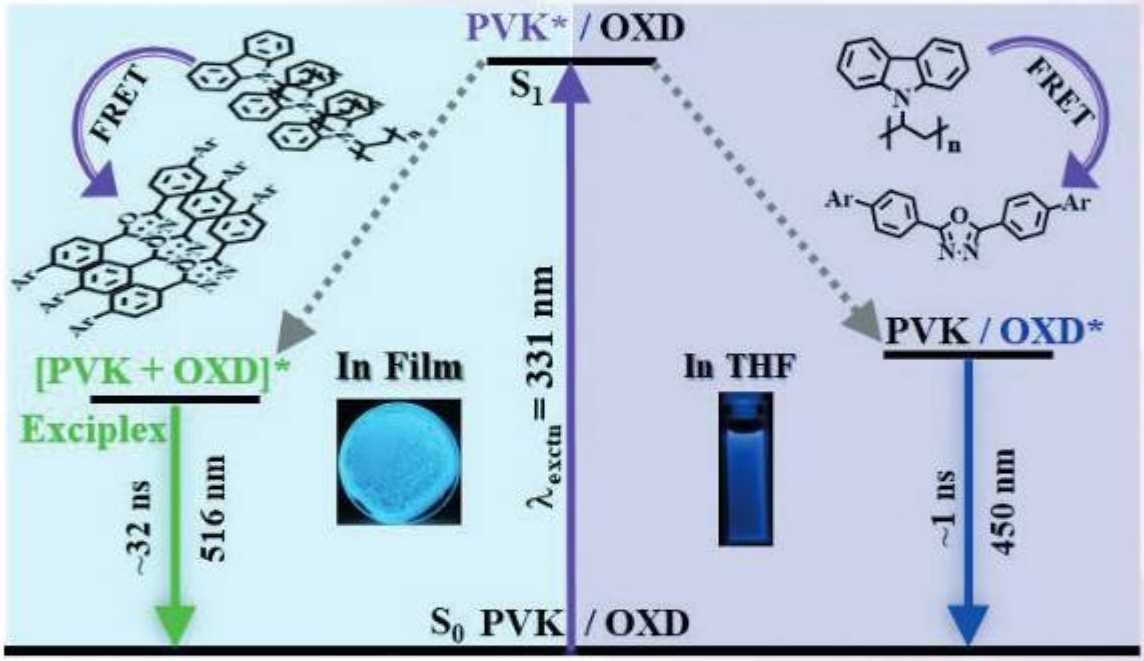
An innovative method using Raman-label (RL) nanoparticle probes now enables the detailed identification of key breast cancer biomarkers (estrogen receptor (ER), progesterone receptor (PR), and HER2) through a technique called spectroscopy. This approach allows for the detection of these biomarkers individually or in combination within a single breast cancer tissue sample using a specific RL-SERS analysis. This method has demonstrated impressive accuracy, with sensitivity and specificity reaching 95% and 92% for individual markers, and 88% and 85% for combinations of markers, respectively. Additionally, a semi-quantitative evaluation of HER2 grading between 4+/2+/1+ tissue samples was also achieved by the Raman intensity profiling of the SERS-tag, which is fully in agreement with the expensive fluorescent in situ hybridization (FISH) analysis.

Reference

Biosensors & Bioelectronics, **2023**, 227, 115177.

Ultrafast intermolecular energy transfer in OLED materials: Excited state dynamics of a blend of poly(vinylcarbazole) and oxadiazole derivative in solution and film states

Dr. Karunakaran Venugopal



Enhancing the efficiency of the Organic Light-Emitting Diode (OLED) device necessitates understanding the dynamics of intermolecular energy transfer between organic layers. A study examining UV-OLED materials—specifically, poly(vinylcarbazole) (PVK) as the donor and a synthesized oxadiazole derivative (OXD) as the acceptor, both in tetrahydrofuran (THF) solvent and film form—has made critical discoveries. When OXD is introduced to PVK, the result is a rapid quenching of PVK fluorescence, demonstrating efficient Förster resonance energy transfer to OXD with about 90% efficiency, occurring within 1.32 picoseconds. Furthermore, an exciplex between PVK and OXD in the film displays a considerable 32.66 nanoseconds lifetime at roughly 516 nm, which is advantageous for device performance. Our study confirms transfer from PVK's triplet state via nanosecond transient absorption, showcasing the importance of these dynamics for improving OLED materials' design and performance.

Reference

J. Phys. Chem. C **2023**, 127, 10640

Amalgamation of synthetic organic chemistry and natural product chemistry

Dr. Ravi Shankar Lankalapalli

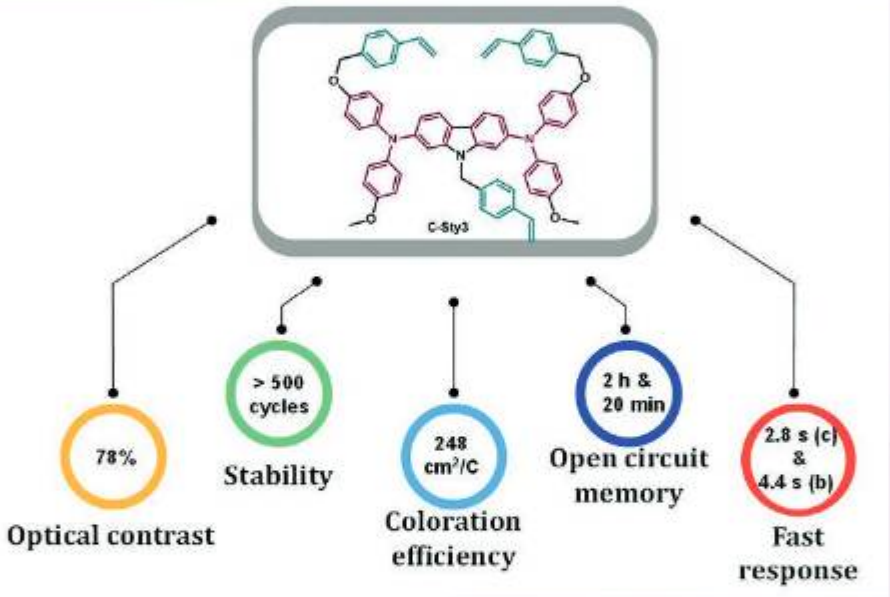
Our research in natural products involves the rigorous isolation, structural elucidation, and bioactivity studies of compounds sourced from plants, food, and microbes. We are at the forefront of synthetic modification of natural products, pioneering new synthetic methodologies relevant to natural products, and achieving the total synthesis of natural product variants. Our unwavering focus is on isolating novel bioactive compounds, even in minute quantities, from both plants and microbes. We employ advanced coculturing techniques to isolate novel metabolites from microbial sources and utilize state-of-the-art 2D NMR and HRMS for structure elucidation to achieve this. Additionally, we relentlessly pursue novel methodologies for the pharmacophores of natural products to obtain a medchem library, and we are dedicated to extensively modifying abundant natural products. Our total synthesis activities encompass structural and stereochemical variations of natural products of profound medicinal relevance.

Reference

Food Chemistry Advances **2024**. DOI: 10.1016/j.focha.2024.100700.
Natural Product Research **2024**. DOI: 10.1080/14786419.2024.2333046.
The Journal of Antibiotics **2023**, 76, 198.

Engineering active layers for organic electrochromic devices: Effect of hyper-crosslinking

Dr. Joshy Joseph



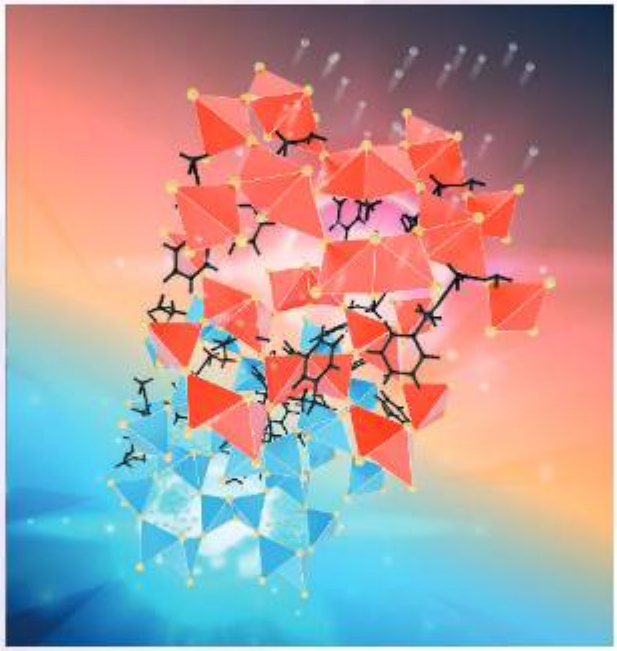
Organic electrochromic devices (ECDs), which employ organic materials in their active layers, rely on the stability and ion mobility of these layers for their efficiency and durability. Among organic materials, triphenylamine derivatives stand out for their straightforward synthesis, low oxidation needs, high mobility for charge carriers, robust electrochemical stability, and adjustable electrochromic features through chemical modification. Using a cross-linking approach enhances the quality and electrochromic function of films made from small molecules. We investigated two carbazole-diphenylamine derivatives, **C-Sty2** and **C-Sty3**, which contain two and three cross-linkable styryl groups respectively, to assess the impact of extensive cross-linking on their electrochromic behavior. Both derivatives create sturdy, smooth, and clear films that resist solvents well and maintain thermal and electrochemical integrity after cross-linking. The **C-Sty3** derivative, with its additional cross-linkable unit, produces denser cross-links, resulting in films with a unique, orderly, and porous structure unlike **C-Sty2**. These hyper-cross-linked films show superior coloration efficiency (248 cm^2/C), visual contrast, and memory in open circuits, highlighting the value of thorough cross-linking to the electrochromic qualities of these materials.

Reference

ACS Appl. Polym. Mater. **2023**, 5, 4170.

Halide perovskites for optoelectronic applications

Dr. Vijayakumar Chakkooth



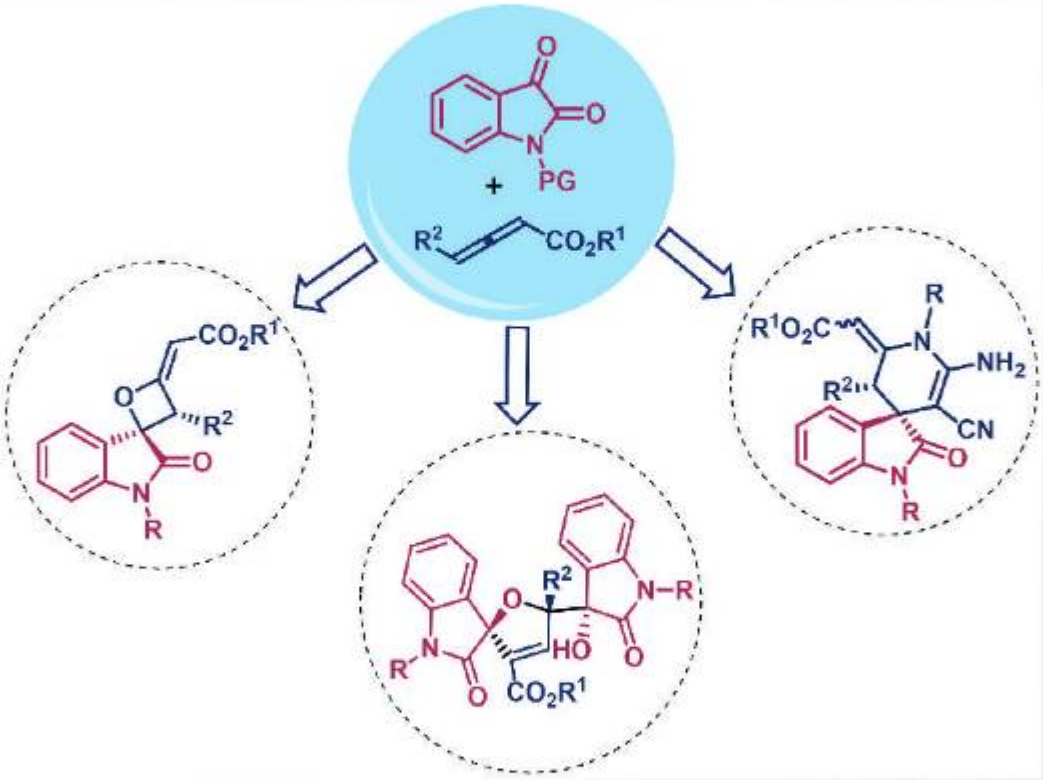
Halide perovskites are noted for their optoelectronic properties, making them ideal for applications such as solar cells and LEDs, due to their high absorption, tunable bandgaps, and long carrier diffusion lengths. Despite their advantages, the environmental and health concerns associated with their lead content have driven research towards lead-free alternatives like organic-inorganic metal halides (OIMHs), which incorporate non-toxic metals such as copper. These materials not only maintain the beneficial properties of traditional perovskites but also exhibit unique temperature- and humidity-responsive fluorescence, making them promising for uses in anti-counterfeiting and moisture detection. Our studies highlight that copper-based two-dimensional OIMHs exhibit thermally induced fluorochromism, with direct bandgaps and fluorescence spectral shifts across temperatures, attributed to electron-phonon interactions. These materials' color-switching fluorescence under varying conditions holds great promise for innovative applications, including in anti-counterfeiting inks and moisture-sensitive assays.

Reference

Chem. Mater. **2024**, DOI: 10.1021/acs.chemmater.4c00045.
Adv. Funct. Mater. **2023**, 2304899.

Metal-catalyst-free innovative protocols to synthesize stereoselective spirooxindoles of medicinal relevance.

Dr. Sasidhar B. S.



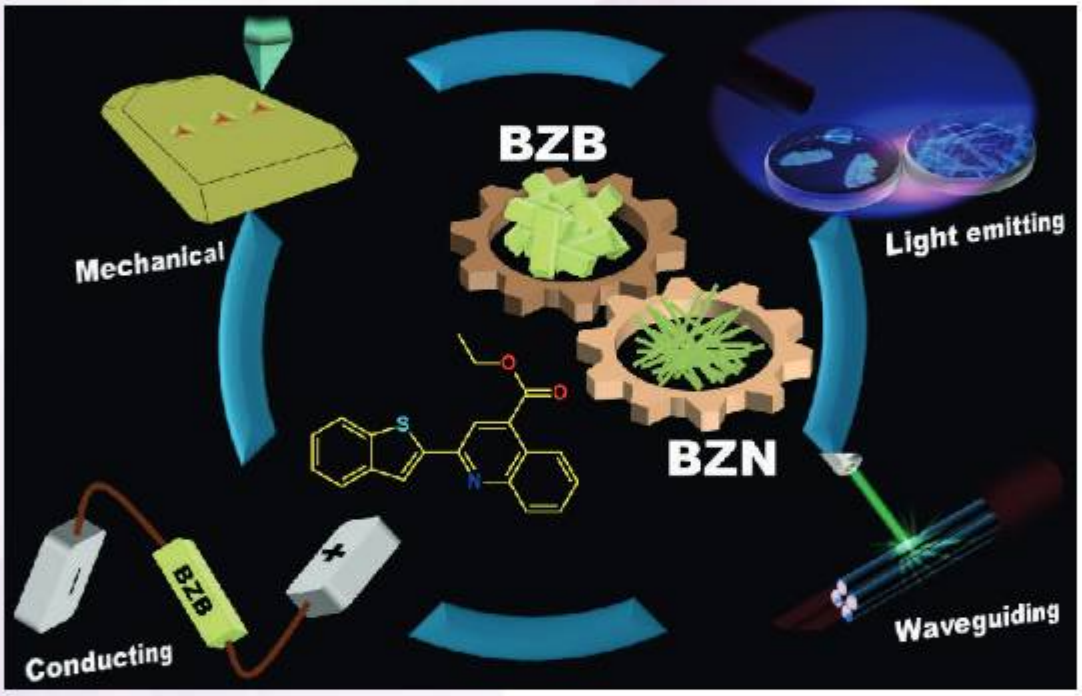
Spiro-heterocycles are key pharmacophores in bioactive compounds, drawing significant interest for their pharmaceutical qualities. Specifically, natural spirooxindoles have been widely recognized for their medicinal benefits. With this in mind, we've focused on creating efficient methods to synthesize bioactive spirooxindoles, leading to our development of a multicomponent synthesis for Spiro-dihydropyridineoxindoles through cascade spiro-cyclization of Knoevenagel /aza-Michael adduct spiro-cyclization. Additionally, we've achieved diastereo/regio-selective synthesis of highly substituted Spiro-oxetaneoxindoles using DBU catalysis and ring annulation of isatins with allenoates.

Reference

Chem. Commun., **2021**, 57, 1746.
J. Org. Chem. **2022**, 87, 21, 13556.
J. Org. Chem. **2023**, 88, 13, 8882.

Polymorphism-driven distinct nanomechanical, optical, photophysical, and conducting properties in crystals

Dr. Sunil Varughese



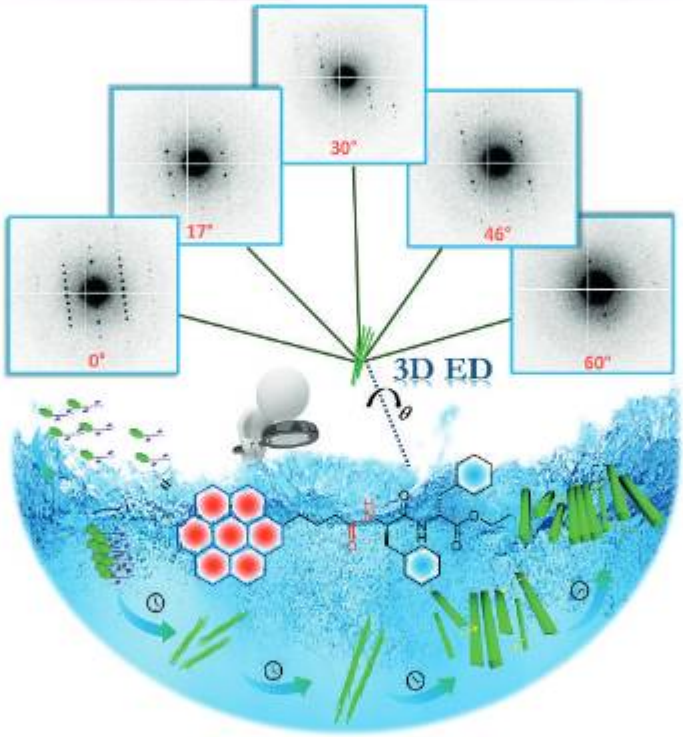
Understanding how the structure and properties of crystalline solids are related is key to developing new materials. Unlike the tedious task of changing organic materials covalently, looking into polymorphism offers a simpler alternative. Polymorphism allows a compound to exist in multiple crystalline forms, each with unique properties. For instance, Ethyl-2-(1-benzothiophene-2-yl) quinoline-4-carboxylate can form as blocks or needles. Blocks show semiconductor attributes due to extensive π-stacking, while needles are insulators due to less stacking. Their different crystal structures also lead to unique nano-mechanical behaviors. Wave-guiding experiments on the acicular crystals revealed the passive wave-guiding properties. Such differences also affect their mechanical and wave-guiding attributes. This highlights the importance of polymorphism in influencing the mechanical, photophysical, and conductivity properties of molecular materials, including the unique finding of light-emitting crystal polymorphs with variable electrical conductivity.

Reference

Chem. Eur. J. **2024**, 30, e202303558.

Nonclassical crystal growth of supramolecular polymers in aqueous medium

Dr. Praveen V. K.



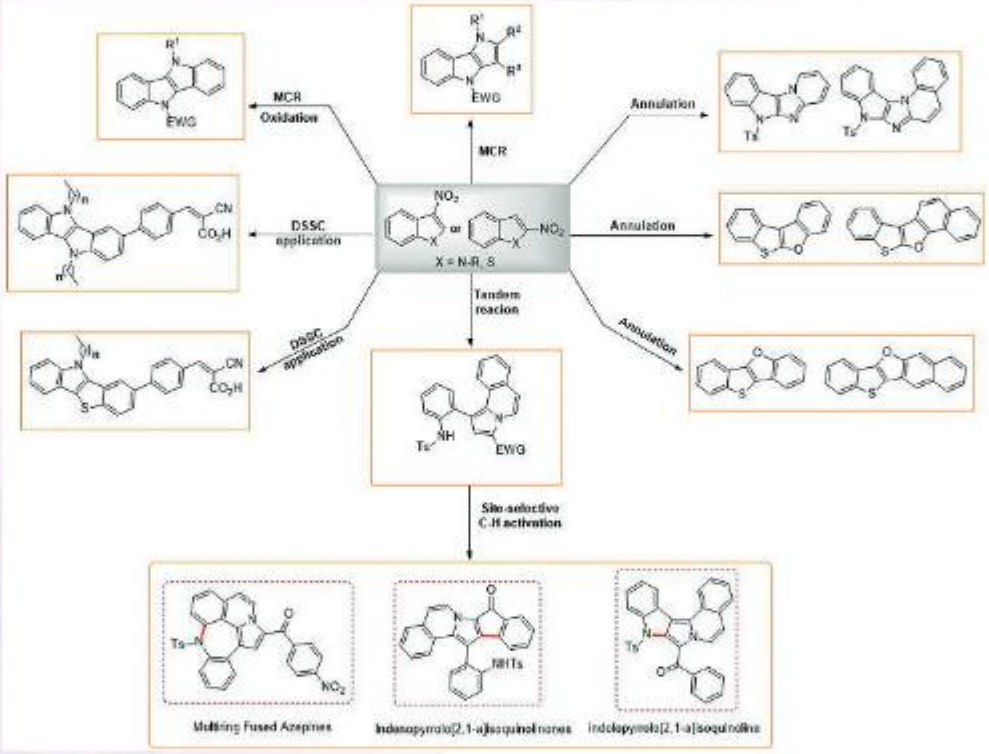
A mechanistic understanding of the principles governing the hierarchical organization of supramolecular polymers offers a paradigm for tailoring synthetic molecular architectures at the nano to micrometric scales. Our work highlights the non-traditional crystal growth mechanism of a superbenzene-diphenylalanine conjugate supramolecular polymer, utilizing 3D electron diffraction for insight into its evolution from poorly crystalline hairy fibrils to ribbon-like crystallites and, finally, microcrystals. This gradual morphological and structural progression, driven by a mix of strong and weak intermolecular forces, deviates from classical crystal growth, influenced by specific stacking and hydrogen-bonding interactions. Comparatively, this process contrasts with similar molecules yielding different structures and demonstrates enhanced functional properties in the resulting crystals.

Reference

Small **2024**, 20, 2306175.

Development of synthetic methodologies towards heteroacenes

Dr. Jubi John



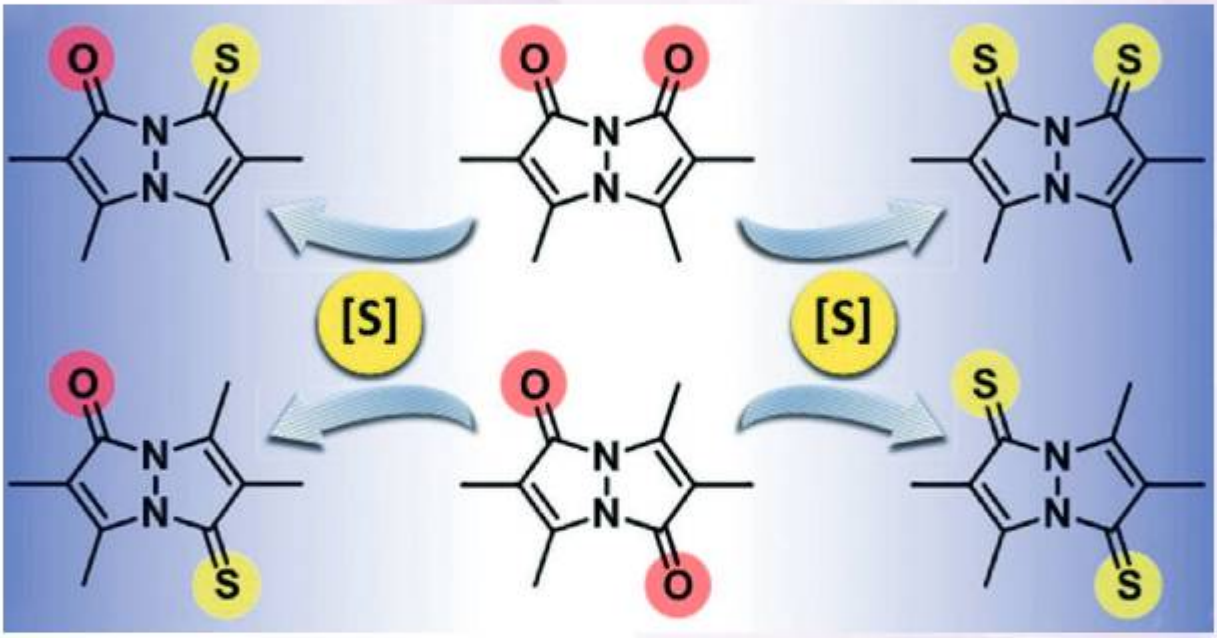
The past decades have witnessed intensive research for developing polycyclic aromatic hydrocarbons/ acenes due to their intriguing electronic and luminescent properties. These features of polycondensedacenes have made them exciting candidates for applications in organic semiconductors, light-emitting diodes, field-effect transistors, and photovoltaics. Recently, N- and S-heteroarenes have emerged as excellent additions to the polycyclic aromatic compounds, which exhibit analog properties requiredforapplicationsasfunctionalmaterials. We have utilized the reactivity of electrophilic benzannulated heterocycles towards the synthesis of fused heterocycles such as indolo[3,2-b]indole, benzothieno[3,2-b] indole, benzothieno[3,2-b]benzofuran, and benzothieno[3,2-b]naphthofuran.

Reference

J. Org. Chem., **2023**, 88, 10027.
J. Org. Chem., **2023**, 88, 9877.

Thioxobimanes and their Au-complexes

Dr. Ishita Neogi



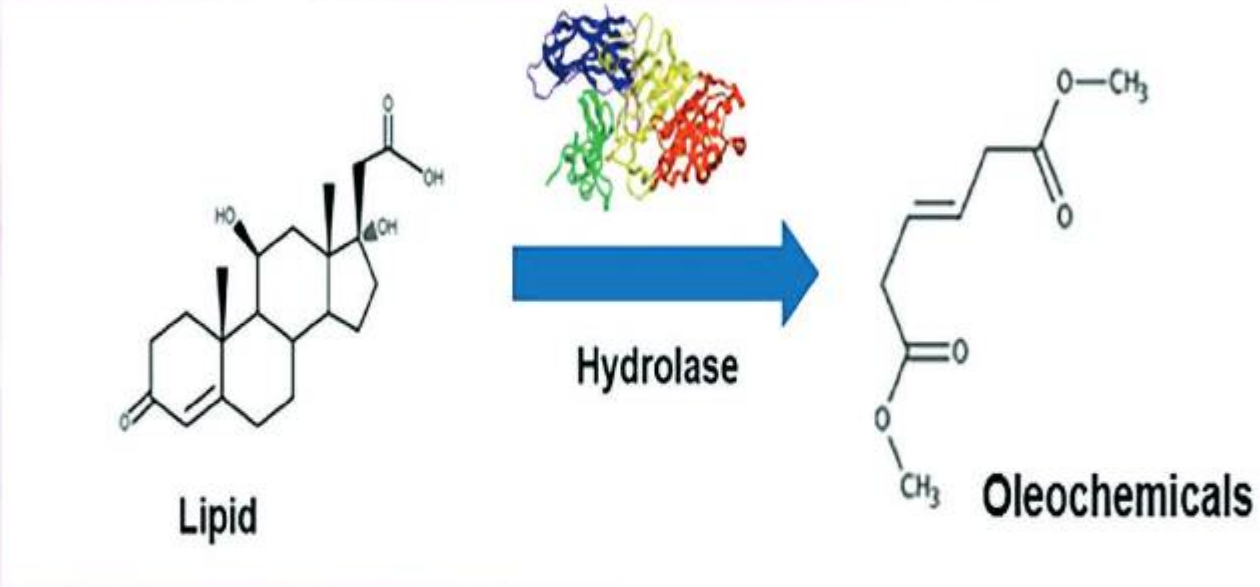
Dioxobimanes, commonly referred to as bimanes, belong to the well-known group of N-heterobicyclic compounds, characterized by a distinctive core structure known as 1,5-diazabicyclo[3.3.0]-octadienedione, which features two endocyclic carbonyl groups. By performing sequential thionation on the carbonyls of both the syn and anti-isomers of the already familiar (Me,Me) dioxobimane, a new series of thioxobimanes was created. These represent the inaugural variants of bimanes incorporating a heavier chalcogenide. These novel compounds underwent thorough spectroscopic and crystallographic characterization, along with computational studies to investigate their aromaticity. Their utility as ligands for transition metals was confirmed by creating a gold(I)–thioxobimane complex, showcasing their potential in this application.

Reference

J. Org. Chem. **2023**, 88, 13475.

A sustainable approach for oleochemicals production from waste through microbial and enzymatic route

Dr. Balakumaran P. A.



Yeast cultures exhibiting significant growth were successfully cultivated using an optimized media designed to maximize biomass and growth rate. The fatty acid content in both yeast and fungi was thoroughly analyzed through FAME analysis, which highlighted the presence of industrially significant fatty acids. Predominant fatty acids detected included Elaidic acid, Linoleic acid, Palmitic acid, Stearic acid, and Gamma-linolenic acid. A comparative analysis of the FAME profiles indicated a higher proportion of fatty acids in both yeast and fungal systems. Moreover, a method was developed for substrate pretreatment and enzymatic hydrolysis, further advancing our understanding and capabilities in this research area.

Reference

Eng. Life. Sci. **2024**, e202400003.

Environmental Technology

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The Environmental Technology Division (ETD) at CSIR-NIIST is dedicated to tackling environmental challenges with a team of 11 scientists, 5 technical officers, and 40 scholars/associates. Specializing in waste management, environmental impact assessments, and dioxin research, the division develops innovative solutions across solid, liquid, and gaseous waste management. It focuses on environmental clean-up technologies and management services and runs a top-tier dioxin research facility, accredited for environmental assessments, water analyses, dioxin, PCBs, and heavy metals testing in environmental and food samples, alongside biodegradability tests for single-use plastic alternatives. The ETD has achieved milestones in wastewater treatment technologies, bio-filter technology for odor control, biodrying for waste management, and contributed to river sand replenishment in Kerala, offering insights for sustainable sand mining. It also proposed mitigation plans for the 2023 Bramhapuram Fire Incident and solved industrial odor issues in Edayar, Kerala. In 2023-24, the division generated 754.1 lakhs in revenue from industry, CSIR, government funding, and analytical services.

Focus Areas

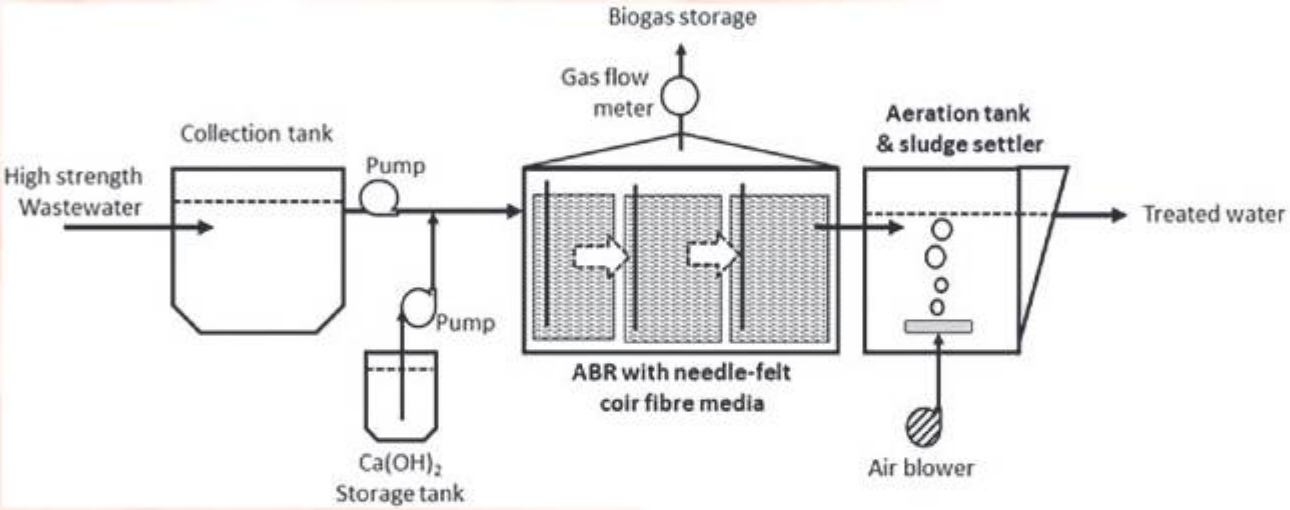
Environmental Clean-up Technologies

Dioxin & Risk Assessment

Environmental Management Services

Needle-felt coir fibre: A natural substitute for synthetic media in anaerobic fixed film reactors

Dr. Krishnakumar B.



In the past, various materials have been evaluated as filter media for anaerobic wastewater treatment. This study aims to assess the feasibility of using needle-felt coir fibre as a biofilm carrier in an anaerobic baffled reactor for treating organic-rich wastewater. Real wastewater from a canteen, with COD of 1400±560 mg/L and SS of 397±23 mg/L, was treated for six months in a pilot-scale unit using the coir fibre carrier. The high porosity (90%) and specific surface area (1450±299 m^2/m^3) of the medium enabled COD (66%) and SS (70.5%) removal, along with biogas recovery, at a lower hydraulic retention time of 14 hrs. Metagenomic analysis revealed a rich and diverse bacterial and methanogenic community in the carrier and settled sludge. Compared to commonly used synthetic media, the needle-felt coir fibre carrier offers technical, environmental, and economic advantages, making it a sustainable replacement for anaerobic wastewater treatment systems.

Reference

J. Environ. Chem. Eng., **2024**, 2, 112382.

Investigation on operational efficiency of industrial gas biofilters

Dr. Partha Kundu

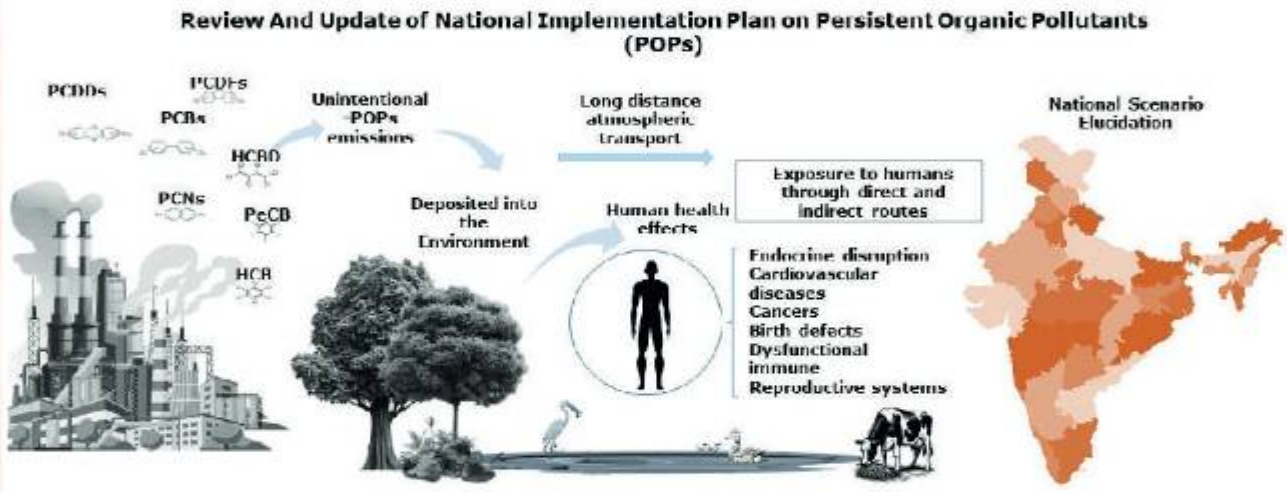
The Kerala State Pollution Control Board (KSPCB) approached CSIR-NIIST to conduct a scientific study on the effectiveness of existing odor control units (biofilters and scrubbers) installed in various industries in the Edayar Industrial Area. The study aimed to evaluate the operational efficiency of these units, analyze air samples for odor and VOC concentrations, and provide industry-specific recommendations. KSPCB awarded the project "Investigation on Operational Efficiency of Industrial Gas Biofilters" to CSIR-NIIST, which involved 20 selected industrial units.Odor is an emerging issue in India that requires addressing various aspects and creating an odor inventory database to help formulate permissible odor emission guidelines and raise awareness. The present study, using the internationally accepted dynamic olfactometry method, aims to contribute towards establishing industrial odor emission guidelines in India, which currently lacks such guidelines.

Reference

https://kspcb.kerala.gov.in/assets/uploads/widget/action_plan/Final_Report_on_Biofilter_inspection_at_Edayar_Indusatrial_area_R1_CSIR-NIIST_(1)_(2).pdf

Unintentional POPs national emission status and mitigation plans

Dr. Prathish K. P.



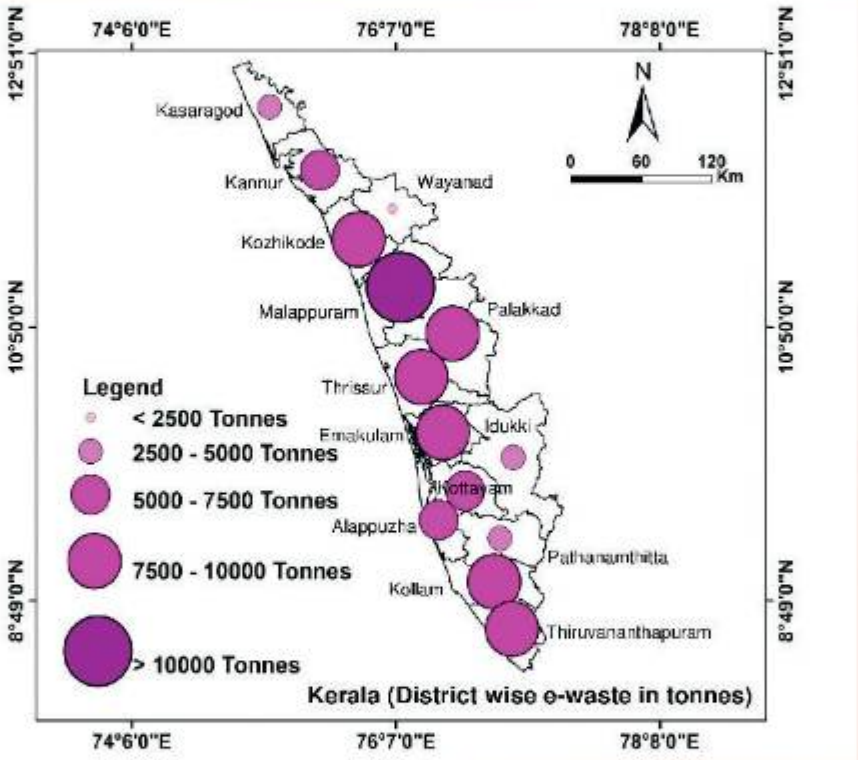
The research team, under the GEF-UNEP funded project (Review &update of National Implementation Plan on POPs), significantly contributes to understanding dioxins and PCBs' emission trends, human health risks, and environmental impact. The work includes a comprehensive review in the biomedical waste incineration sector, highlighting future perspectives for developing countries. We developed an affordable GC-MS/MS method for dioxins and PCBs analysis and studied bioaccumulation in the Eloor-Edayar industrial area, demonstrating the societal implications of environmental science. The team's innovation extends to developing sorbents for anionic contaminants like bromate and chromate, advancing environmental analytical chemistry. Our rapid response to the Brahmapuram waste dumpyardfire and achieving FSSAI-National Reference Laboratory status for analyzing hazardous contaminants underscore our commitment to environmental safety and quality.

Reference

Journal of Hazardous Materials, **2023**, 133384.
Environmental Pollution, **2023**, 334, 122161.

Inventory and management of E-waste in the state of Kerala

Mr. Saurabh Sakhre



This study highlights the surge in Electronic Waste (E-waste) due to increased usage of electronic devices, focusing on Kerala's situation. It leverages 2017-2020 sales data and product lifespan estimates to predict a peak of 97,541 tonnes of E-waste in 2028-2029. The analysis hinges on correlating sales with E-waste generation, employing product-type-specific guidelines to estimate waste quantities. A detailed management strategy based on reduce, reuse, and recycle (3R) principles proposes 78 collection units and 273 recycling units statewide, with a significant focus on Malappuram due to its high population density. This approach aims at efficient E-waste handling, promoting sustainable consumption and resource conservation. It outlines a comprehensive "cradle-to-grave" model, offering a crucial framework for environmental regulators and researchers to manage E-waste at various administrative levels.

Reference

Environmental Monitoring and Assessment **2024**, doi.org/10.1007/s10661-024-12739-3.

Demonstration of a sustainable bioenergy-based model effluent treatment plant for desiccated coconut industries

Mr. Dhani Babu Talakala

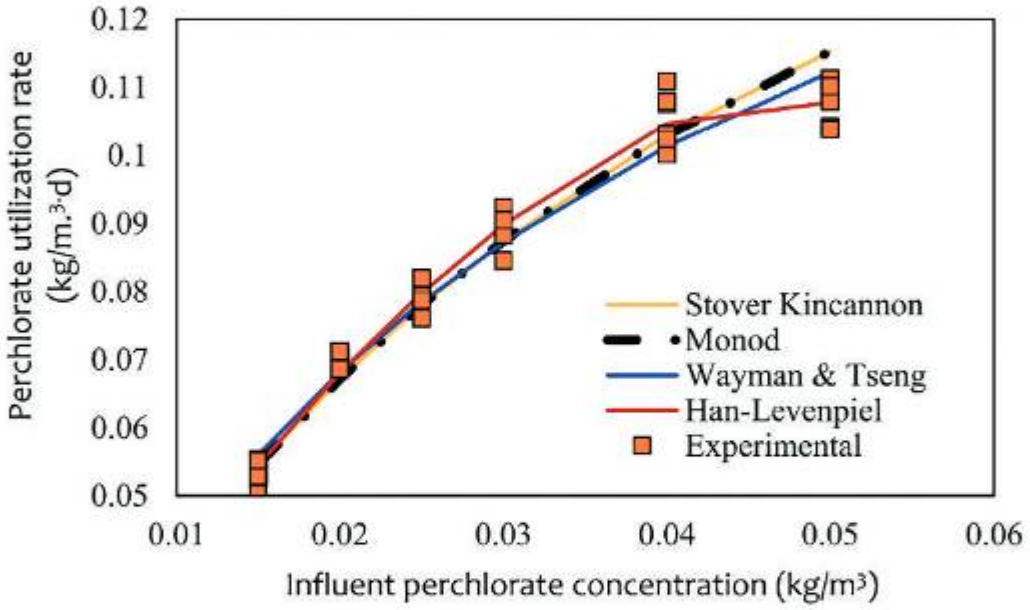
CSIR-NIIST is addressing wastewater management in the desiccated coconut industry with the "Buoyant Filter Bioreactor" (BFBR), an innovative high-rate anaerobic system for high-strength organic wastewatercontaining high levels of oil, fat, and suspended solids.A demonstration-scale plant at M/s. Vittal Agro Industries, Kasaragod, supported by the Coconut Development Board (CDB), aims to create 500 m^3 of biogas and 60,000 litres of reusable water. Targeted for replication across 180 similar industries in India, the model plant showcases the technology for effective wastewater treatment. The initiative is funded by the Department of Science and Technology (DST) and was proposed by the Kerala State Pollution Control Board (KSPCB)

Reference

Patent No: US 6, 592, 751.

Kinetics of the biological reduction of perchlorate from groundwater in an anaerobic fixed film bioreactor (AFBR)

Mr. Akshay Shende



Perchlorate has gained recognition as a significant environmental contaminant due to its persistence in the environment. Laboratory studies have shown that perchlorate acts as an endocrine disruptor by interfering with thyroid-dependent processes. The study examined the kinetics of bacterial reduction of perchlorate (ClO_4^-) across various concentrations (15–50 mg/L), hydraulic retention times (HRTs), and a specific mass ratio using several models including Monod and Wayman-Tseng. It aimed to determine key kinetic parameters, comparing these with actual experimental outcomes. All models showed a high correlation coefficient (R2 > 0.97) with experimental data, indicating reliable predictions. The study found that generalized uncompetitive inhibition at optimized ratios influenced the reactor's efficiency, with minimum non-inhibitory perchlorate concentration pegged at 12 mg/L. Any model could be used for ClO_4^- concentrations up to 30 mg/L, but beyond this, the Wayman-Tseng model was more accurate in predicting reactor performance.

Reference

Case Studies in Chemical and Environmental Engineering, **2024**, 9, 100649.

District survey report for sand mining or river-bed mining in Kollam, Kerala

Mr. Sravanth Tangellamudi

Illegal sand mining, driven by urban expansion closer to the river and the desire to minimize transportation costs, is becoming increasingly common. This practice not only disrupts natural landscapes and aquatic ecosystems but also throws off the balance of stream channels. To combat this issue and promote sustainable sand mining practices, the District Survey Report (DSR) collects and analyzes field data along with information from various departments on the region's geology, mineral wealth, and existing mining activities. This data helps in ensuring the scientific utilization of mineral resources, aiming to restore and maintain the ecosystems of rivers and sand sources. The report also addresses the environmental impacts of river sand mining, proposing measures to protect the environment and ecology, and prevent bank erosion. It includes calculations for annual sand replenishment in rivers, leveraging scientific methods such as the Dendy-Bolton equation.

Reference

https://cdn.s3waas.gov.in/s39fc3d7152ba9336a670e36d0ed79bc43/uploads/2023/08/20230818100.pdf

Chitin glucan complex from fungal mycelium for sustainable application

Dr. Knawang Chhunji Sherpa

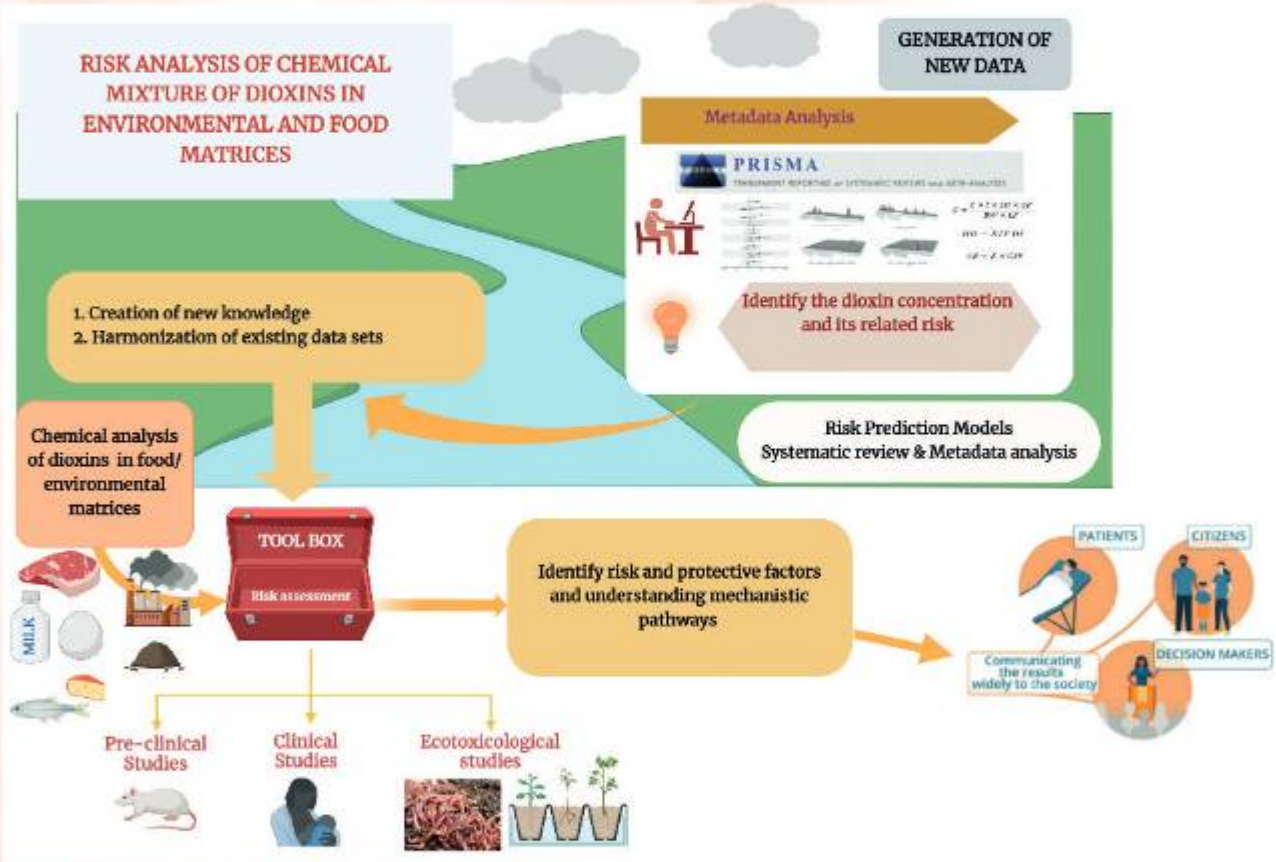
Fungi offer a sustainable manufacturing platform of filamentous mycelium containing chitin, glucans, galactomannan and proteins, and is influenced by nutrition, environmental factors, and fungal species. Controlled growth fermentation condition leads to consistent physicochemical properties of chitin unlike crustacean-derived chitin that are region and season dependent. This research aims to optimize growth conditions and develop a mild extraction process for CGC, primarily for applications such as nano paper, filters, or packaging material. Additionally, CGC has shown potential as an eco-friendly adsorbent for removing azo dyes, like Congo red, from water, highlighting its utility in environmental clean-up efforts.

Reference

Solid Waste Treatment Technologies: Challenges and Perspectives; CRC Press: **2024**, 36.

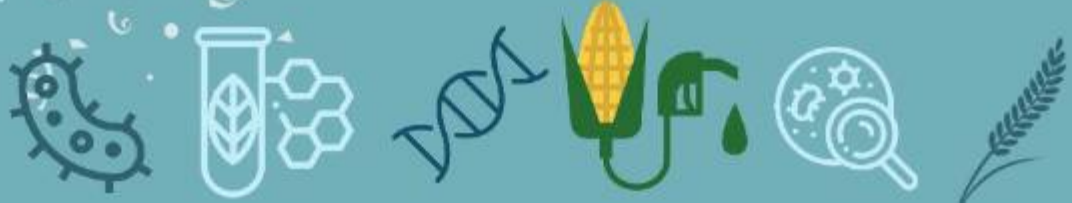
Design of ecotoxicological and human health risk assessments for dl-POPs

Divisional Activity



Dioxins and dioxin-like polychlorinated biphenyls are a group of lipophilic compounds classified as persistent environmental pollutants (POPs). Major sources of dioxin emissions include industrial effluents, open burning practices, and biomedical and municipal waste incinerators, which pose ecological risks to terrestrial and aquatic organisms. These emissions can enter the food chain and accumulate in animal-origin foods (AOFs), leading to potential health risks for humans. Facilities have been established to develop risk prediction models, conduct systematic reviews and meta-data analyses, assess risks using human and animal models, and test soil quality through earthworm and plant models for dioxin exposure.

Microbial Processes & Technology



Dr. Madhavan Nampoothiri K.
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Dr. Harsha Bajaj
(Scientist)

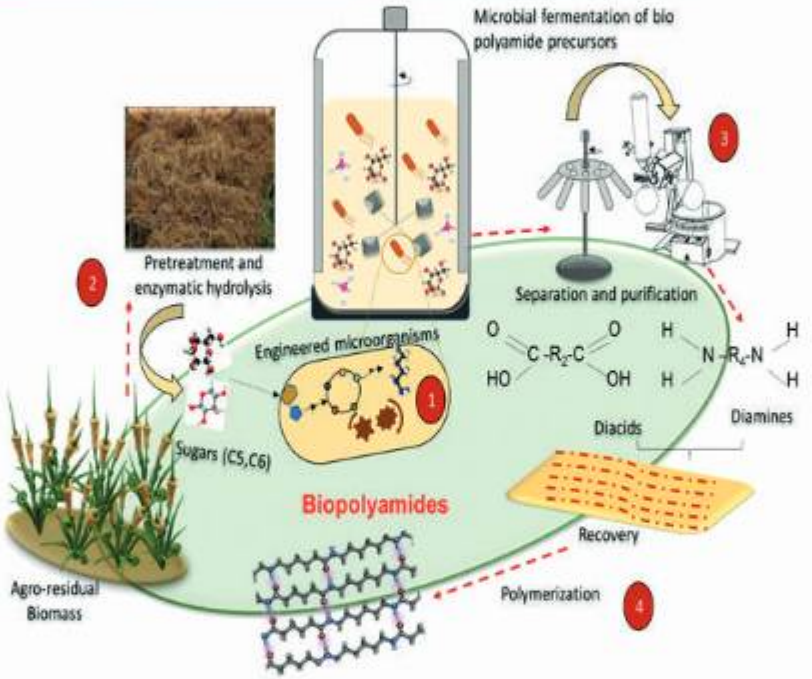
Mr. Jedy Jose
(Senior Technical Officer-2)

The Microbial Processes and Technology Division (MPTD) is committed to conducting high-quality research and development in cutting-edge areas of Biotechnology. The division places significant emphasis on exploring and maximizing the value of local biological resources while ensuring environmental sustainability. Its research spans industrial enzymes, biofuels, metabolic engineering, health, genomics, molecular plant-microbe interactions, and nutraceuticals. A specialized "Centre for Biofuels" focuses on second-generation bioethanol research and encompasses a pilot plant for lignocellulosic bioethanol production and a solid-state fermentation enzyme production facility, enhancing cost-efficiency and process handling. Additionally, the division engages heavily in microbial-based bioprocess R&D, establishing key industrial partnerships in fermentation technology, biofuels, biomass conversion, probiotics, algal technology, and microbial-based agricultural products. This collaborative approach with national and international organizations highlights its commitment to innovation and sustainable biotechnological advancements.

Focus Areas

Recombinant strains of *Corynebacterium glutamicum* for the production of chemicals from biomass

Dr. K. Madhavan Nampoothiri



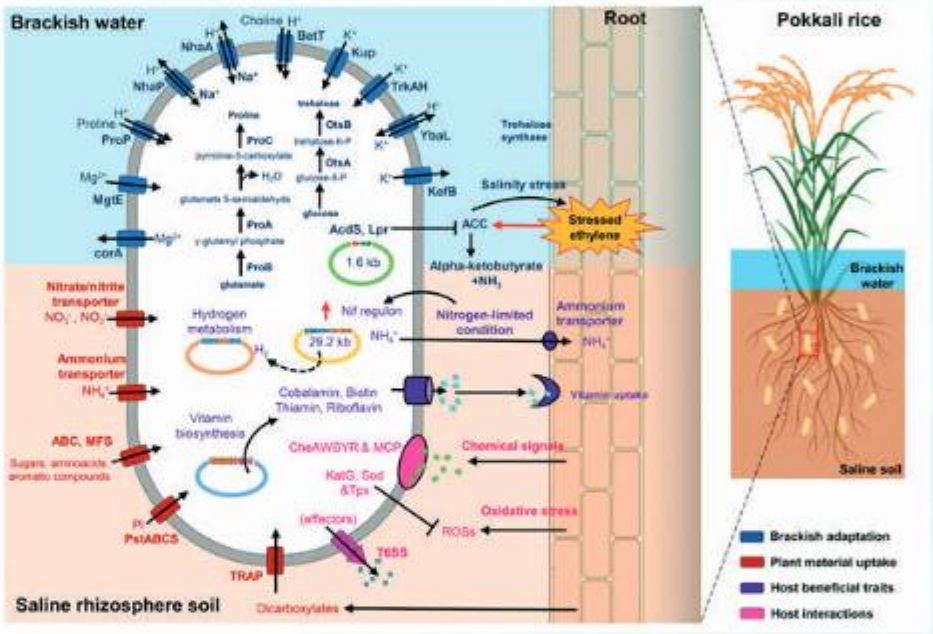
Our group specializes in modifying *C. glutamicum* to utilize C5 sugars like xylose from biomass hydrolysate or pre-treated liquor for producing valuable compounds. We've achieved notable progress in generating amino acids, namely lysine, and glutamate, from rice straw and wheat bran using engineered strains (recombinant pentose-utilizing *Corynebacterium glutamicum*). Additionally, we have developed constructs for the direct use of biomass by co-expressing endoglucanase and β-glucosidase in *C. glutamicum* DM1729 to facilitate direct lysine fermentation from cellulose. Recently, widened the study to include the production of sugar alcohol (xylitol) and sugar acids (xylonic acid). Currently, we are investigating the fermentative production of bio-based plastic monomers such as α, ω-diamines (putrescine and cadaverine) and α, ω-amino acids (5-aminovaleric acid and gamma-aminobutyric acid) from lignocellulosic biomass derived from rice straw hydrolysate. This work has the potential for high-tech applications in bio-nylon synthesis.

Reference

Handbook of Biorefinery Research and Technology. Springer, **2024**.1007/978-94-007-6724-9_20-1.

Characterization of a novel root-associated diazotrophic rare PGPR taxa, Aquabacter pokkalii sp. nov., from salt-tolerant pokkali rice

Dr. N. Ramesh Kumar



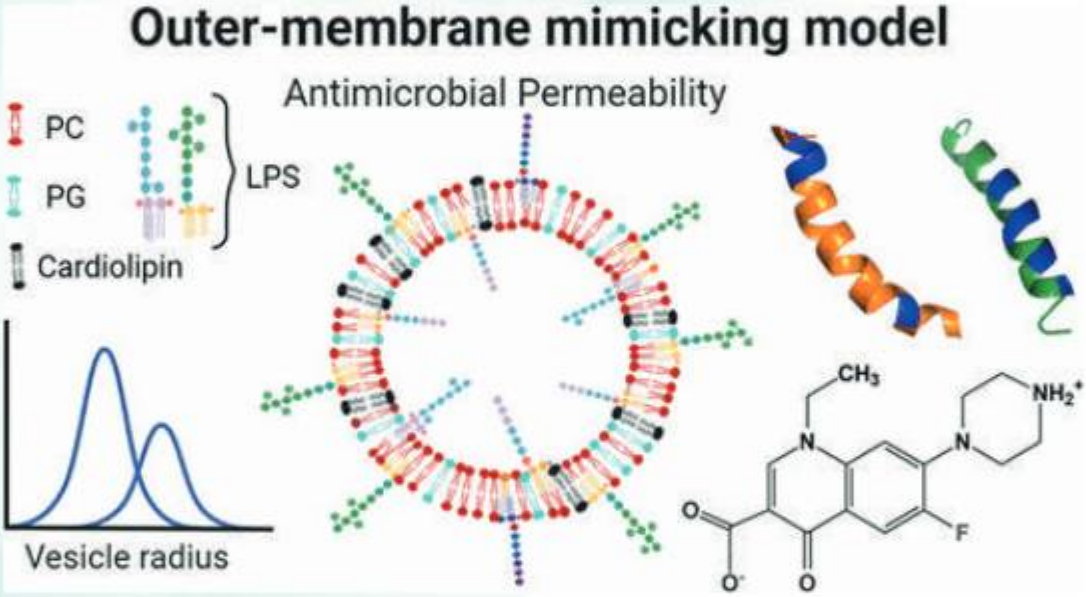
Our current knowledge on plant growth-promoting rhizobacteria (PGPR) and its beneficial interactions is primarily from terrestrial plants, and very little is known from crops of brackish environments. Here, we characterize strain L1I39T, the first Aquabacter species with PGPR traits isolated from a salt-tolerant pokkali rice cultivated in brackish environments. L1I39T is positive for 1-aminocyclopropane-1-carboxylate deaminase activity and nitrogen fixationand can promote pokkali rice growth by supplying fixed nitrogen under a nitrogen-deficient seawater condition. Importantly, enhanced plant growth and efficient root colonization were evident in L1I39T-inoculated plants grown under 20% seawater but not in zero-seawater conditions, identifying brackish conditions as a key local environmental factor critical for L1I39T-pokkali rice symbiosis. Detailed physiological studies revealed that L1I39T is well-adapted to brackish environments. In-depth genome analysis of L1I39T identified multiple gene systems contributing to its plant-associated lifestyle and brackish adaptations. The 16S rRNA-based metagenomic study identified L1I39T as an important rare PGPR taxon. Based on the polyphasic taxonomy analysis, we established strain L1I39T as a novel Aquabacter species and proposed Aquabacter pokkalii sp. nov. Overall, this study provides a better understanding of a marine-adapted PGPR strain L1I39T that may perform a substantial role in host growth and health in nitrogen-poor brackish environments.

Reference

BMC Genomics **2024**, 25, 424.

Bacterial outer-membrane-mimicking giant unilamellar vesicle model for detecting antimicrobial permeability

Dr. Harsha Bajaj



The construction of bacterial outer membrane models with native lipids like lipopolysaccharide (LPS) is a barrier to understanding antimicrobial permeability at the membrane interface. Here, we engineer bacterial outer membrane (OM)-mimicking giant unilamellar vesicles (GUVs) by constituting LPS under different pH conditions and assembled GUVs with controlled dimensions. We quantify the LPS reconstituted in GUV membranes and reveal their arrangement in the leaflets of the vesicles. Importantly, we demonstrate the applications of OM vesicles by exploring antimicrobial permeability activity across membranes. Model peptides, melittin and magainin-2, are examined where both peptides exhibit lower membrane activity in OM vesicles than vesicles devoid of LPS. Our findings reveal the mode of action of antimicrobial peptides in bacterial-membrane-mimicking models. Notably, the critical peptide concentration required to elicit activity on model membranes correlates with the cell inhibitory concentrations that revalidate our models closely mimic bacterial membranes. In conclusion, we provide an OM-mimicking model capable of quantifying antimicrobial permeability across membranes.

Reference

Chem. Commun., **2023**, 59, 93.
Langmuir, **2023**, 39, 16.

Materials Science

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Dr. Bhoje Gowd E.
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Dr. Jayasankar K.
(Senior Principal Scientist)

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Dr. Sundararajan M.
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Dr. Sushanta Kumar Sahoo
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Er. Venkatesan J.
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Mr. Peer Mohammed A.
(Senior Technical Officer-3)

Dr. Ramaswamy S.
(Senior Technical Officer-2)

Mr. Harish Raj V.
(Technical Officer)

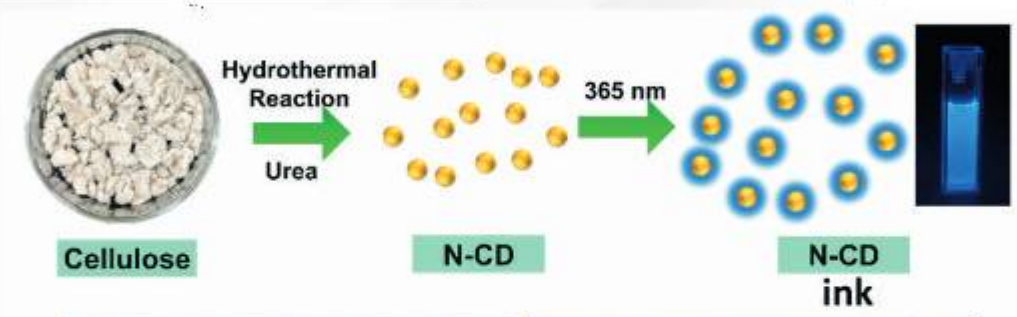
Mr. Harikrishnan H. S.
(Technician-1)

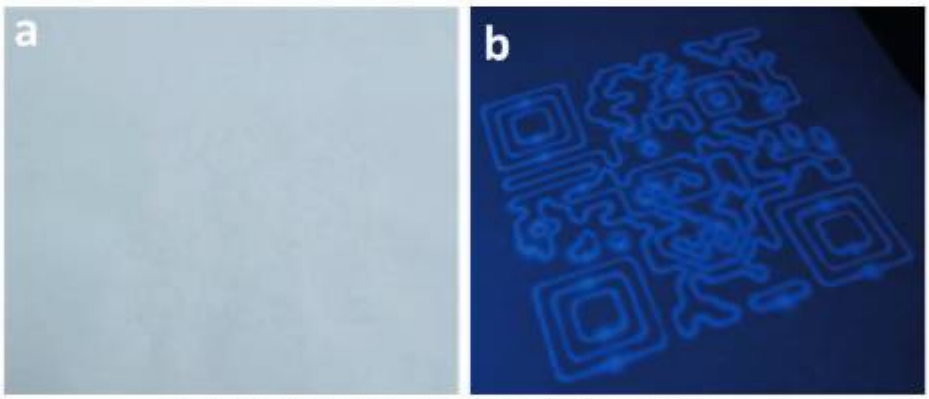
The division comprises 17 scientists, 3 technical officers, 1 technician, 1 Group D staff, 2 emeritus fellows, and 81 research scholars. We focus on research in metallic materials, polymers, electronic materials, minerals extraction, and waste recycling to promote self-reliance and a circular economy in India. Specializing in developing aluminum and magnesium alloys, lightweight materials, composites for aerospace, defense, transport, bio-based coatings, and biodegradable polymers, the division also works on ceramic materials, rare earth, and carbon dioxide-capturing technologies. In 2023-24, we managed 30 government-funded projects, nine CSIR projects, 18 industry projects, and two international collaborations, generating a revenue of Rs. 686 lakhs. Key collaborations include Hindalco, Atlascopco, Tata Steel, Pidilite, ZF WABCO, ITC, and Momentive for advanced functional materials research and development. Our innovations include technology for low-cost construction materials from foundry silica sand and eco-friendly bio-resin coatings and a process for plant oil-based bio-resin for Paper Coatings as an eco-friendly alternative to plastic liners and validated the coatings in industry conditions. The division also developed biodegradable coir-geo composites suitable for injection molding and extrusion technologies. We organized industry meetings to discuss strategic materials and manufacturing technologies. Additionally, it has signed MoUs with HAL and VSSC for aerospace and satellite application projects.

Focus Areas

Inkjet inks

Dr. K. I. Suresh





Printed pattern under (a) normal and (b) UV light

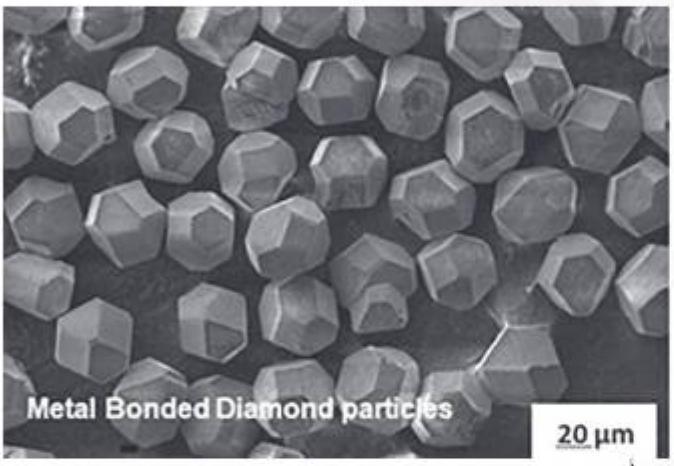
Fluorescent compounds are increasingly recognized for their potential in anti-counterfeiting solutions due to technological advances. However, their widespread adoption is hindered by the high cost of rare earth metals, low photostability, and toxicity. A promising alternative is the use of carbon dots, particularly those derived from waste bamboo stem cuttings through a hydrothermal process. These N-doped carbon dots (NCD) are stable, affordable, and environmentally friendly, boasting intense fluorescence and high water solubility. Their application in anti-counterfeit printing was demonstrated through inkjet printing on paper, revealing their capacity for reversible encryption-decryption based on pH changes. This approach not only offers an eco-friendly solution to bamboo waste but also advances the production of fluorescent ink for anti-counterfeiting measures.

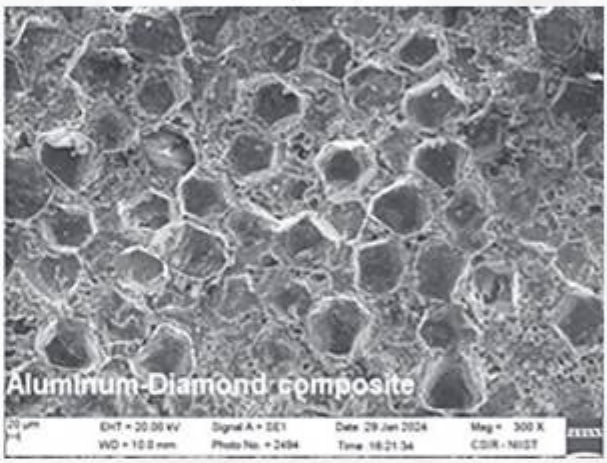
Reference

Chemistry Select, **2024**, 9, e202303346

High thermal conducting aluminium-diamond composite by liquid metal squeeze infiltration technique for thermal management applications

Dr. T. P. D. Rajan





The liquid metal squeeze infiltration technique is successfully used for the processing of metal-bonded diamond particle-reinforced aluminium composite with very high thermal conductivity. The aluminium matrix alloy of 356 Al-Si-Mg alloy in As cast condition provides a thermal conductivity of 154 W/mK. The incorporation of high thermal conducting metal bonded diamond particles into the aluminium alloy matrix enhanced the thermal conductivity remarkably to 479 W/mK. The diamond particle reinforced Al composite can be used for the fabrication of thermal management components with selective infiltration and finds potential application in aerospace, automotive, electronics, defense, and energy sectors.

Reference

Journal of Manufacturing Processes, **2023**, 104, 177

Carbon dioxide capture from point sources of the steel industry

Dr. U. S. Hareesh

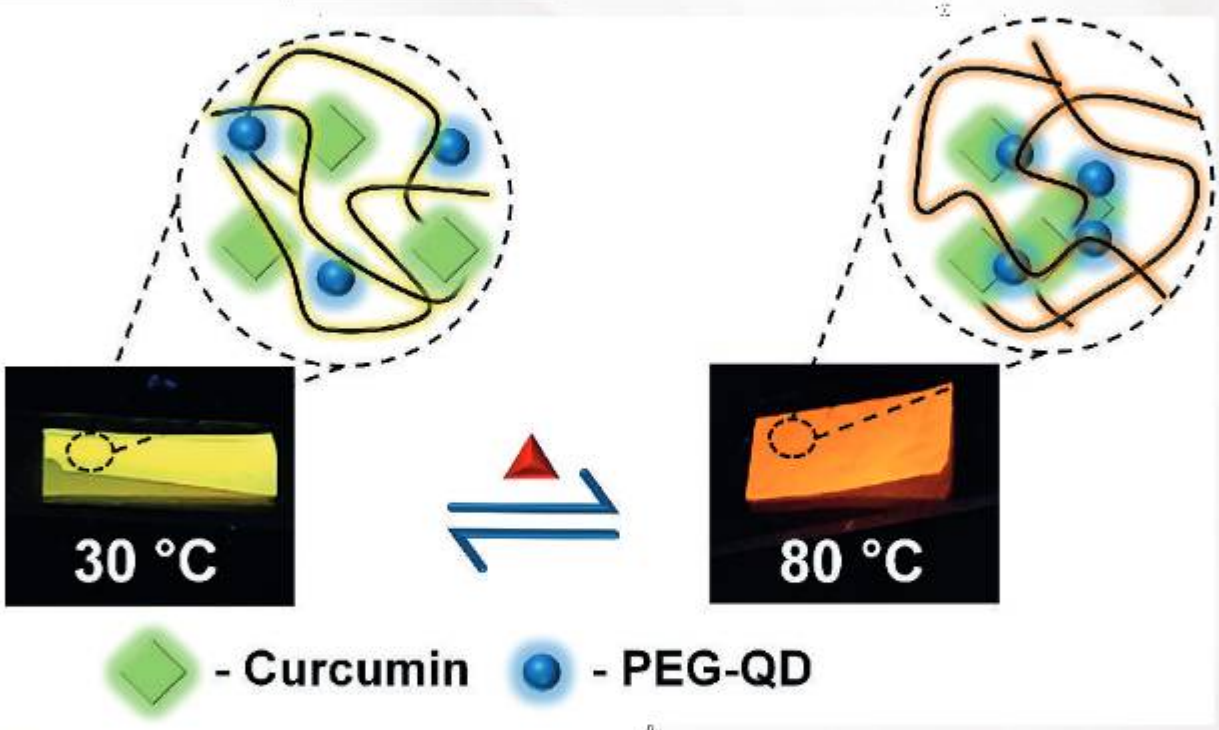
Reducing CO_2 emissions in steel production is crucial, with the industry responsible for about 8-9% of total carbon emissions. Employing sorbents for the selective in situ capture of CO_2 from point sources of emission is a viable option for controlling the CO_2 release to the atmosphere.CSIR-NIIST has developed selective CO_2 sorbent materials, effective between 80-650°C, which show promise in capturing CO_2 directly from emission sources. This patented formulation, created in partnership with Noritake Co Ltd, offers quick absorption, high capacity, and durability. As part of the CCUS mission, NIIST partnered with Tata Steel Limited, Jamshedpur has set up a unique facility to test these sorbents under real industrial conditions, focusing on alkali and alkaline earth-based inorganic formulations based granules for selective CO_2 sorption from stove gas exit temperatures (200–400°C) and amine-functionalized silica sorbents for Blast Furnace Top gas (80– 100°C).

Reference

Indian Patent Application Number: 202121018578

Sustainable and smart biodegradable polymer-based packaging films

Dr. E. Bhoje Gowd



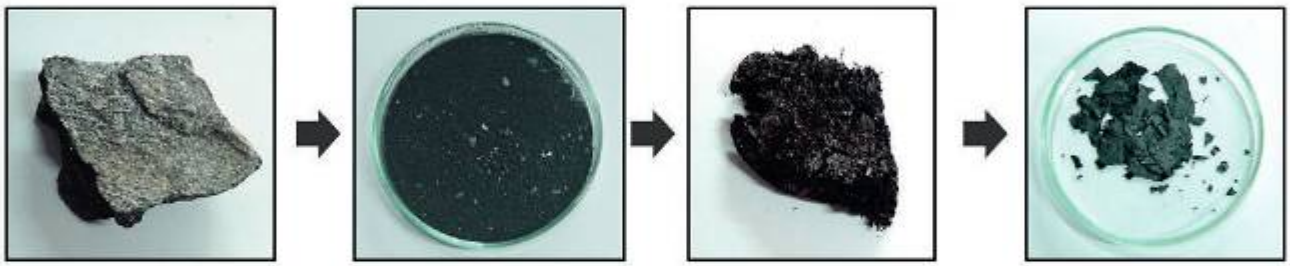
Developing biodegradable and biocompatible fluorescent materials with tunable emission in the solid state has become increasingly relevant for smart packaging and biomedical applications. In general, different emissions originate from twisted intramolecular charge transfer, charge transfer states, excimer states, or excited state intramolecular proton transfer, which are sensitive to the molecular structure and the environment. CSIR-NIIST has developed a range of chromophore-embedded biodegradable polymers and their hybrid materials, including poly(L-lactide) (PLLA) and poly(3-hydroxy butyrate) (PHB) and two-dimensional quantum dots for packaging applications. The properties and performance of these materials are intrinsically linked to their molecular and hierarchical structures.

Reference

Chem. Commun., **2024**, 60, 10954.
Eur. Polym. J., **2024**, 203, 112676.

Top-down approach for high yield production of graphene & graphene oxide from natural graphite

Dr. K. Jayasankar



GRAPHITE ORE | GRAPHENE | GRAPHENE OXIDE | GRAPHENE OXIDE FILM

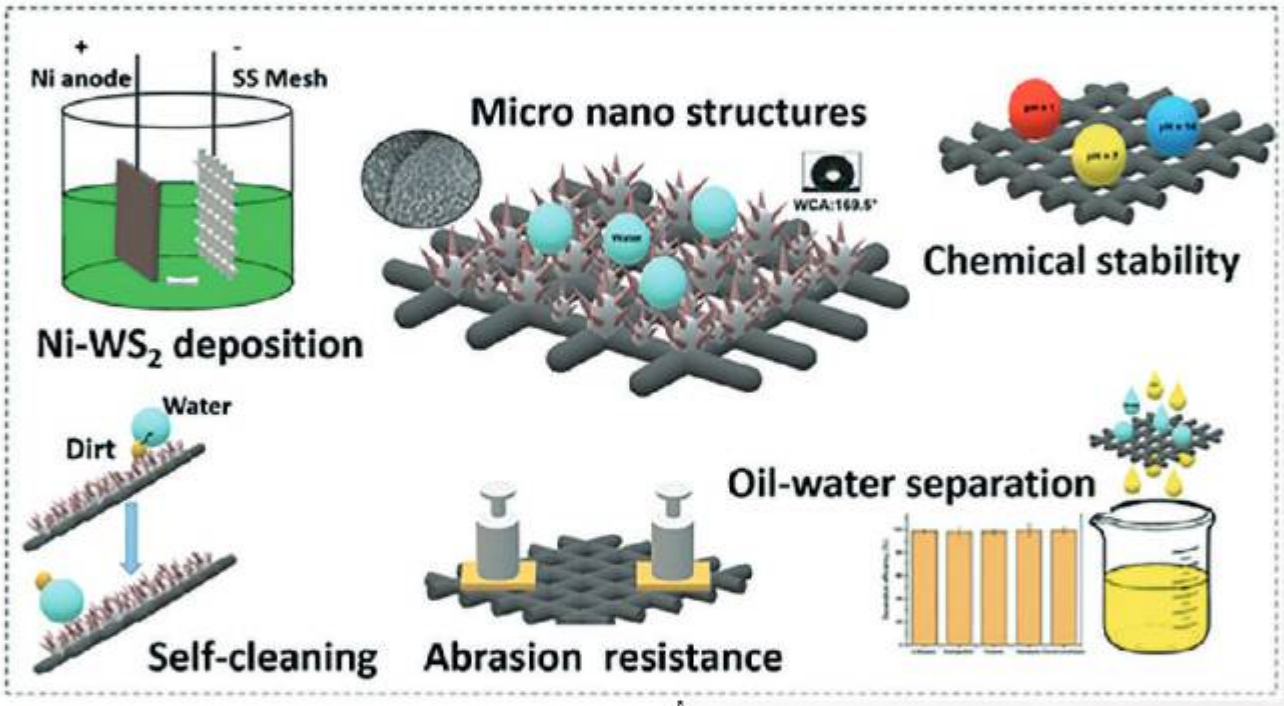
The development of graphene technology relies on the synthesis of high-quality graphene from abundant graphite resources. While most graphene technology in India uses synthetic graphite, there's a vast reserve of natural graphite minerals, including flaky and microcrystalline graphite. Our work focuses on an effective and low-cost method for mass-producing high-quality graphene directly from graphite ore. We've developed a room-temperature exfoliation process that doesn't require harsh chemicals, making it environmentally friendly and cost-effective. This process can produce graphene and graphene oxide from natural graphite, avoiding the need for expensive, high-purity synthetic graphite. Our analysis shows that the graphene sheets maintain excellent structural integrity, useful for various applications. The XRD data highlight the graphene sheets' (002) plane, and the Raman spectrum indicates a favorable I2D/IG ratio, suggesting the production of double- to triple-layer graphene. The synthesized graphene exhibits a large surface area and strong electrical conductivity, addressing the demand for cost-effective graphene manufacturing for widespread applications.

Reference

Diamond & Related Materials **2024**, 144, 111025

Fabrication of a robust superhydrophobic stainless steel mesh for efficient oil/water separation

Dr. S. S. Sreejakumari



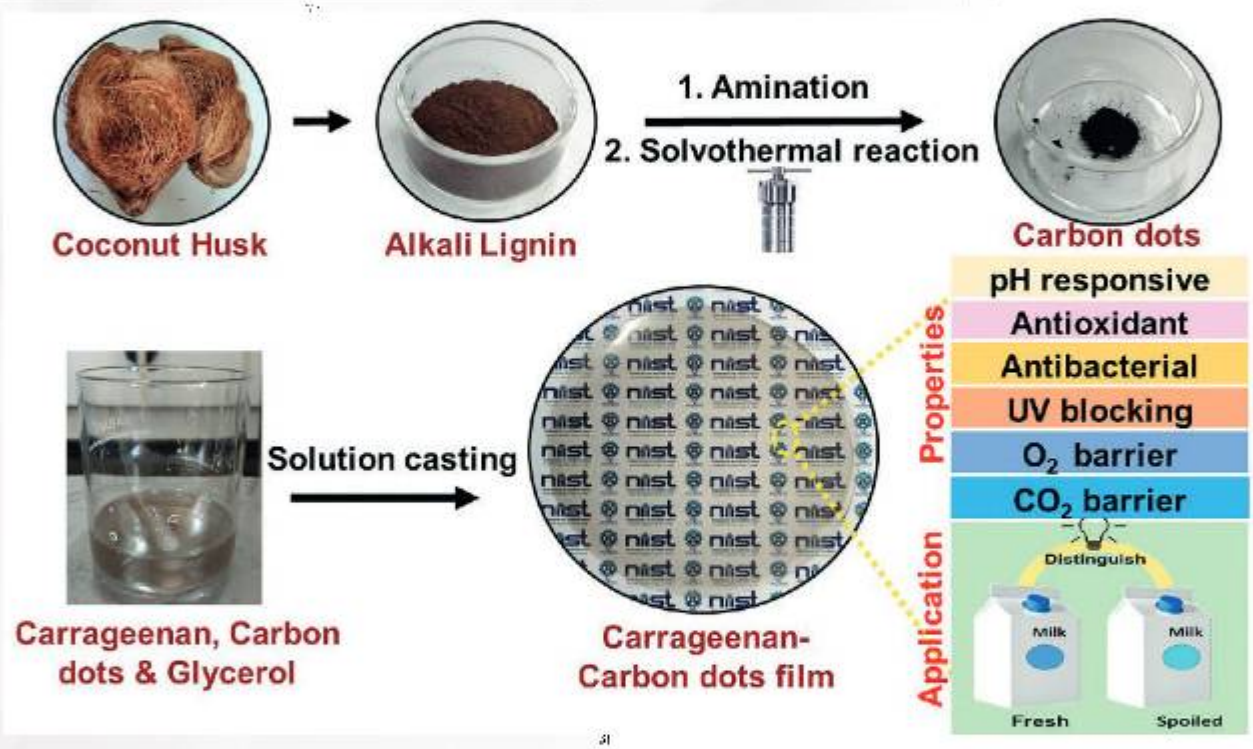
Removing oil from water efficiently is crucial in environmental science. Low-cost and durable metallic meshes, designed to selectively separate oil or water through gravity filtration, are key to addressing this challenge.We developed a superhydrophobic stainless steel mesh (SHSM) with Ni-WS2 through a single-step electrodeposition process for effective selective oil removal from water. This mesh exhibits superhydrophobic and superoleophilic properties, evidenced by a water contact angle of 169.5°, enabling highly efficient oil-water separation (>98% efficiency) even after repeated usage. Its surface characteristics were analyzed using SEM, AFM, XRD, and WCA measurements. Moreover, the SHSM is corrosion-resistant, self-cleaning, and maintains structural integrity in diverse chemical environments, highlighting its suitability for industrial-scale oil-water separation in harsh conditions.

Reference

Journal of Industrial and Engineering Chemistry **2024**, 135, 425.

Biopolymeric intelligent packaging

Dr. Sushanta Kumar Sahoo



Lignin extracted from coconut husk is used to make an advanced green packaging material. Carbon dots (CDs), made from amine-grafted lignin via a solvothermal process, are mixed into a carrageenan biopolymer to create a smart barrier film. This film changes color with pH, serving as an indicator of food spoilage, such as in milk, by altering its fluorescent emission. It maintains strong tensile strength, enhances elongation, and offers UV protection while retaining over 80% transperancy. The addition of carbon dots significantly lowers the oxygen and CO_2 permeability by 79% and 81%, respectively, enhancing the film's barrier properties. Further, the carbon dots significantly boost the antioxidant and antibacterial properties of the carrageenan film. This innovative film merges functionality with sustainability, marking a step forward in green and sustainable intelligent barrier packaging solutions.

Reference

Int. J. Biol. Macromol, **2024**, 266, 131005.

Artificial Intelligence
&
Machine Learning

Dr. Ramesh K. V.
(Chief Scientist & Head)

Dr. Arun Kumar V.
(Senior Scientist)

Focus Areas

- Deep learning algorithm
- Interdisciplinary implementation of AI & ML
- Predictive data analytics
- DL models for IoT and edge computing

The AI & ML Unit at CSIR-NIIST is dedicated to establishing a robust predictive analytics team that offers advanced and customized AI/ML solutions to stakeholders. Our research aims to develop intelligent deep learning algorithms and analytics systems that learn from real data to provide data-driven innovative solutions. We are committed to creating a diverse range of algorithms, including hybrid modeling, to deliver AI-powered data analysis, visualization, predictive analytics, and data science skills development. By integrating mathematical modeling, system dynamical modeling, artificial intelligence data integration, and image analytics, we aim to impact various sectors such as agriculture, food processing, healthcare, energy, ecology & environment, and more. Our team is focused on developing a deep learning-based segmentation model that can be used for crop identification, medical image processing, and analysis of confocal and other high-resolution images. Moreover, our in-house developed deep learning-based multivariate solutions are undergoing validation for predicting disease breakouts, such as Malaria, using real-time data obtained from various districts in India.


Science
&
Technology
Services

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Mr. Ajit Prabhakaran
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(Executive Engineer)

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(Chief Scientist & Head)

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Dr. Praveen V. K.
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Mr. Rahul L. R.
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(Chief Scientist & Head)

Mr. Rahul L. R.
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Ms. Anila G. K.
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Mr. Moni V.
(Principal Scientist & Coordinator SDP)

Dr. Jayamurthy P.
(Principal Scientist & Coordinator AcSIR)

Dr. Joshy Joseph
(Principal Scientist & Coordinator Jigyasa)

Information Technology Services Unit (ITSU)

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(Principal Scientist & Head)

Dr. Ribin Jones S. B.
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Mr. Pushkin S.
(Senior Technical Officer-2)

PROJECT MONITORING AND EVALUATION DIVISION (PMED)

The Project Monitoring and Evaluation Division (PMED) is integral to the Institute, overseeing key aspects such as project monitoring, evaluation, and resource management. This team is the critical liaison between CSIR-NIIST and a diverse network of collaborators, including central and state funding agencies, public and private R&D organizations, and universities across India.

PMED's responsibilities encompass a comprehensive range of functions, including the thorough review and approval of all new project proposals and ensuring continuous monitoring of ongoing projects to meet their objectives and deadlines. It manages the effective allocation and utilization of resources and infrastructure, facilitates the recruitment of project personnel, and oversees the timely achievement of work packages and deliverables. Last year, PMED managed 109 Grant-In-Aid and 27 CSIR projects, with a cumulative budget of INR 11275 lakhs. The division also plays a crucial role in engaging with the CAG and internal audits, adapting to changes in PFMS requirements to ensure compliance. Additionally, PMED provides essential updates and insights to the Director, Management Council (MC), and Research Council (RC) on project progress and management. The division is also responsible for stakeholder engagement, which includes managing customer care, responding to CSIR-HQ requirements, preparing performance analyses, annual reports, and technology updates for the CSIR portal, and addressing Parliamentary queries.

Through these functions, PMED ensures efficient project execution and maintains robust relationships with the stakeholders, supporting the overall success of our initiatives.

BUSINESS DEVELOPMENT DIVISION

The Business Development Division (BDD) is integral to fostering industry interactions, managing client negotiations, handling intellectual property (IP), and marketing and commercializing technologies. BDD actively engages with internal and external stakeholders, including NIIST scientists, customers, funding agencies, and line ministries. With a team of skilled professionals, BDD is well-equipped to meet the diverse needs of our stakeholders. Our primary goal is to leverage the institute's expertise to offer innovative research solutions that address both industry-oriented and societal challenges. The major projects with industries provide comprehensive contract research, consultancy, and technical services for developing new processes, new product development, generating basic knowledge, troubleshooting existing process issues, and optimizing and providing solutions for operational challenges, apart from commercializing technologies/know-how developed.

The BD division handles strategic partnerships, overseeing negotiations and collaborations with industries for contract projects, including sponsored collaborations, consultancy, and industry testing services. Additionally, BDD manages IP by setting prices for know-how, technologies, and intellectual property and by licensing these assets while protecting inventions through patents and copyrights. Regarding Corporate Social Responsibility (CSR), CSIR-NIIST coordinates CSR funding from corporates as outlined in Section 13, Schedule VII of the Companies Act 2013, encouraging companies to invest their CSR funds in supporting our research and development efforts.

KNOWLEDGE RESOURCE CENTER

The Knowledge Resource Center (KRC) has undertaken a wide range of activities to efficiently and effectively support the institute's R&D activities. KRC has significantly contributed to the institute's research efforts by expanding its collection with numerous print and digital resources, including patents, theses, journals, standards, and other academic databases, as well as online tools for writing and scientific image creation.

During the year 2023-24, KRC acquired a total of 46 new books, including dissertations and procured nine ISO/ESO standards. The implementation of the Radio Frequency Identification (RFID) system has been successfully completed, and books are now circulating using RFID technology, enhancing the efficiency and security of library services.

NKRC continues to provide full-text articles from prestigious publishers such as the American Chemical Society, Royal Society of Chemistry, American Institute of Physics, Springer Nature, Oxford University Press, and Taylor & Francis. Additionally, specialized databases like SciFinder-n, Web of Science, ASTM Standards, and Qpat are available, along with e-journals managed directly by NKRC. The institutional repository software, Dspace, and the library automation software, Koha, have both been upgraded to the latest versions.

The KRC also continues to support research writing with tools such as Grammarly Premium, ensuring error-free manuscripts, and iThenticate, which scholars use to check their original works for plagiarism. Furthermore, 'Biorender,' an online tool for scientific image creation with thousands of pre-made icons and templates from over 30 fields of life sciences, remains accessible to our research community. Trial access to the chemistry database 'Science of Synthesis' was also provided, and a webinar was conducted on common pitfalls in scientific writing.

The KRC also maintains and updates the institute website with publications, VIDWAN database, and Institutional Repository (IR), which now holds 3200 journal publications and 740 other documents, including doctoral theses and news items. KRC assisted scholars for using Grammarly Premium, Web of Science, reference management software, Sci-Finder, journal selection tools, literature search databases, prior art searches, and open access.

The KRC remains dedicated to supporting the institute's mission by providing comprehensive resources and services to enhance the research capabilities of our scholars.

CENTRAL INSTRUMENTATION FACILITY UNIT (CIFU)

The Central Instrumentation Facility Unit (CIFU) was established on 1st June 2023, with the aim of providing a comprehensive testing and analytical facility through a single-window approach. It offers access to all equipment and facilities across various divisions. One of its key goals is to operate as a revenue-generating model through accreditation from NABL and BIS.

During the reporting period, the Unit achieved record revenue generation of INR 109.05 Lakhs, with INR 68.18 lakh originating from external samples alone. CIFU is also in the process of introducing BIS Hall Marking of Precious Metals and is expected to acquire the Hall Marking Certification from the Bureau of Indian Standards in the current financial year. CIFU has also introduced new initiatives such as training and skill development in basic operation and maintenance, advanced instrumentation, and data analysis, for research scholars of CSIR-NIIST.

Looking ahead, CIFU aims to focus on customer care, efficient sample processing, general maintenance, and training programs to benefit ongoing research projects and external clients of CSIR-NIIST.

HRAD

The Human Resources and Academic Division (HRAD) at CSIR-NIIST coordinates the academic activities of ongoing PhD students, including those funded by CSIR, UGC, DST/INSPIRE, and KSCSTE, to ensure the smooth progress of their research endeavors. HRAD oversees the admission process for PG/UG Project Dissertations and Internships of students from colleges and universities across India. We conduct various programs such as week-long orientation and induction training for newly recruited staff and campus visits by students from external colleges and schools on occasions like National Science Day,

National Technology Day, and Open Days. To enhance the scientific knowledge of students across different disciplines, we organize monthly institute seminars involving faculty and students from NIIST and prominent scientists and experts from other institutions. Under the auspice of the Jigyasa project, we facilitate student academic activities and host various science-related programs for school and college students from external institutions.

MSc Projects and Internships

CSIR- National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), hosts candidates pursuing M.Sc / BSc./ M.Tech / B.Tech in any branch of Chemical sciences, Chemical Engineering, Environmental Engineering, Life science, Artificial Intelligence to undertake research training towards partial fulfillment of their degree. In addition to laboratory training, candidates will be exposed to scientific ethics, good laboratory practice, and career opportunities in a chosen area of their research. In the academic year 2023-2024, the institute trained 394 Postgraduate Dissertation students and 190 interns.

Online Application Portal is: http://projectapp.niist.res.in/psp/ .

JIGYASA Activities

JIGYASA is a major CSIR initiative to broaden its Scientific Social Responsibility (SSR) through programs that cross over from schools & textbooks to research at CSIR Laboratories. JIGYASA at CSIR-NIIST, Thiruvananthapuram, inculcates inquisitiveness in young minds through school centric scientist student interaction programs, institutional visits, workshops or camps for teachers & students, faculty development programs (FDPs), Virtual lab development, etc.

Major Events @CSIR-NIIST(April2023-March2024)

No	Name of the Programme	No.of Schools/ Colleges/ Institutions Benefitted	Total Students Benefitted	Total Teachers Benefitted
1.	Institutional Visit to CSIR-NIIST for School/ College Students	45	1415	100
2.	Scientists from CSIR-NIIST visit schools to deliver popular science lectures.	8	1250	80
3.	Teacher Transformation Training Programme and Faculty Development Programmes	3	Nil	90
4.	Open Day Celebrations (National ScienceDay, National Technology Day, CSIR Foundation Day)	30	1700	60
5.	Summer program for school children to have a hands-on experience in scientific research.	1	25	5

6.	Hands-on Training Workshop for PG Students and Research Scholars.		29	Nil
7.	Other Jigyasa Programmes	2	950	

Total Jigyasa Programmes Conducted in the year2023-24:~50

Total students Benefitted: ~ 5370

Total teachers Benefitted:~275

Coordinator:

Dr. Joshy Joseph, Principal Scientist (Email:joshy@niist.res.in)

Placement Activities

CSIR-NIIST is committed to developing and enhancing technology to benefit humanity. With nearly fifty years of expertise, we have consistently evolved to provide our students with a well-rounded educational experience and exposure. Recognizing the need for skilled professionals in the current global and dynamic industries, our interdisciplinary research programs prepare students with the essential skills to thrive in diverse work settings. Explore our research programs and discover talented individuals who are ready to drive progress to new heights.

Coordinator:

Dr. Rakhi R.B., Principal Scientist(Email: rakhiraghavanbaby@niist.res.in)

SKILL DEVELOPMENT PROGRAM

CSIR-NIIST offers a range of skill development and upskilling courses catering to undergraduates, postgraduates, and unemployed youth, which aligns with the "Integrated Skill Initiative" of CSIR. The program's key features include knowledge generation, hands-on experience with advanced equipment, and a focus on bridging the gap between industry and academia, aiming to promote entrepreneurship. The curriculum encompasses theory and practical classes, group discussions, brainstorming sessions, practical experiences, and case studies, with equal emphasis on theory and practical sessions. Furthermore, the program extends its benefits to workers and staff members in various industries, providing them with efficient training, analytical and communication skills, personality development, team-building, and expertise in operating high-end equipment. This comprehensive approach contributes to improved employability, living standards, job security, business development, and sustainable economic growth, ultimately fostering job creation and social development. In 2023-24, the Institute conducted 21 SDPs and benefitted more than 1100 students.

Coordinator:

Mr. Moni V., Principal Scientist (E-Mail: monivishnu@niist.res.in)

No.	Course
1	Synthetic Organic Chemistry-Hands on Training on Fundamentals and Specialized Reactions
2	H_2 Energy from Renewable Resources and Circular Economy
3	Training of Trainers on Food Microbiology and Food Analysis
4	Intellectual property Rights-Patent Drafting and practice

5	Techno-Economic Analysis of selected Green Technologies for the Production of Value-Added Products from Agro-Industrial Materials
6	Training on practical requirements for the research scholars of College of Agriculture
7	Environmentally Sound Management of Hazardous Wastes and PoPs in India
8	Food Laws in India
9	Training on Energy Generation, Storage and Management and Sustainable Materials and Technologies
10	Training on Liquid and Solid Waste Management Problems in Hospitality Industry Sector
11	Project Training and Internship trainings
12	Introduction to CRISPR-CAS9 Engineering and their Applications in Medicine
13	Construction of Genetically Engineered Microorganism
14	Hands on Training Of IR,UV-VIS & Fluorescence Spectroscopic Techniques
15	Microscopy and X ray Diffraction Methods in Materials Characterization
16	Analytical Chemistry and Instrumentation Techniques
17	Microbial Identification from Sequences to Species
18	Orientation Training on Greywater Treatment and management
19	Refresher Course higher Secondary School Chemistry Teachers from Schools across Kerala, Sponsored by Directorate of General Education, Kerala
20	Dye-Sensitized Solar Cells: Fundamentals, Device Fabrication, Characterizations and Applications
21	Hands -on Training Workshop in Fluorescence spectroscopy, Confocal Fluorescence/Raman Microscopy and Cellular Imaging

INFORMATION TECHNOLOGY SERVICES UNIT (ITSU)

The Information Technology Services Unit (ITSU), established as a distinct entity on May 17th, 2023, was formerly part of the Knowledge Resource Center. ITSU aims to meet the laboratory's information requirements by establishing a robust, efficient, and secure communication infrastructure. The laboratory benefits from dual internet leased lines (100 Mbps from NKN and a backup from BSNL) and is interconnected through a gigabit fiber optic network, supporting over 1250 wired and wireless connections. Efficiency is enhanced through the use of separate VLANs, while security is ensured via campus-wide antivirus and firewall protections. ITSU oversees a comprehensive IT infrastructure, including a data center with servers, storage, and networking devices, and manages the maintenance of over 500 desktops/laptops and peripherals. The unit plays a pivotal role in updating the institute's bilingual website and intranet portal, which provides essential information for scientists and scholars. Online recruitment portals for various positions and programs, including Project Assistants and skills development, are managed effectively by ITSU. Additionally, ITSU maintains AADHAR-enabled biometric attendance system, issues identification cards, oversees digital display systems for showcasing research and notices, and provides printing and scanning services with advanced equipment. Following CSIR guidelines, e-Office has been implemented for efficient file movement and minimal manual record handling.

RESEARCH PROJECTS

CONTRACT RESEARCH PROJECTS 2023-24			
Sl No	**Project Title**	**Client**	**Project Leader**
AGRO PROCESSING & TECHNOLOGY DIVISION			
1	Modernization Of Jaggery Production Units -Initiative Towards Energy Efficient Hygienic Jaggery Production	DST	Dr T Venkatesh
2	Design And Development Of An Eco-Friendly Post-Harvest Technology For Simultaneous Dehydration And Disinfection Of Agro Crops	DST	Dr T Venkatesh
3	Spice Essential Oil Based Nanoencapsulates As Natural Preservatives	Spices Board	Dr P Nisha
4	Development Of Pineapple Leaf Based Biodegradable Straw And Paper Food Packaging Containers (Tea, Coke, Ice Cream Cups & Popcorn Box)	Ministry Of Food Processing Industries (MoFPI)	Dr Anjineyalu Kothakota
5	Prospecting Iminosugars From Tubers Of Kerala: Identification , Isolation, Characterization And Their Role In Glycaemic Control And Anti-Infection	SERB	Dr M V Reshma
6	Technological Intervention For Value Addition Of Polyherbal Spent Materials Ayurvedic Industries	DST	Dr P Nisha
7	Coconut Neera Sugar And Its Glycaemic Index (GI) And Glycaemic Load (GL) Studies	CDB	Dr M V Reshma
8	Design And Fabrication Of A Cooling Die To Control The Microstructure Of Plant- Based Meat Analogues	SERB	Dr Vasanth Raghavan
9	Exploration Of Exosomal And Non-Exosomal Micron As From Grapes Against Triple Negative Breast Cancer	SERB	Dr S Priya
10	Establishment Of Pine Apple Leaves Processing Unit For Biodegradable Table Ware Manufacturing	M/S Vazhakulam Agro AndFruit Processing Company Ltd	Dr Anjineyalu Kothakota
11	Effects Of Exosoal Micro RNAs Isolated From Tender And Mature Coconut Water On Gut Health And Microbiome Dynamics	CDB	Dr S Priya
12	Development Of Spices Based Nebulizer Formulation For Prophylaxis Of Respiratory Distress	Spices Board	Dr Tripti Mishra
13	Technology Development For Production Of High Value Medium-Chain Triglycerides Oil From Coconut Oil	Coconut Development Board	Dr Vasanth Raghavan

14	Large Scale Production Of Iron-Rich Multivitamin Multilayer Encapsulate For Developing Novel Designer Rice	DBT	Dr C Anandharamakrishnan
15	Preclinical Evaluation Of The Effects Of Coconut Vinegar On Gut Health	CDB	Dr R Venkatesh
16	Estimation Of Residual Sulphur On Copra And Coconut Oil Sample	M/S KLF Nirmal Industries Pvt Ltd	Dr P Nisha
17	Millets As Functional Food For Addressing Obesity By Manifesting Gut-Brain Axis	DST	Dr P Nisha
18	Phytotherapeutic Approach For The Management Of Benign Prostatic Hyperplasia: A Multifaceted Target-Specific Inhibition Of Selective Alpha -Adrenergic Receptor, 5-Alpha-Reductase And Phosphodiesterase Type 5	ICMR	Dr A Kumaran
MICROBIAL PROCESSES & TECHNOLOGY DIVISION			
1	Investigation Of The Dynamics &Mechanism Of Flocculation By Polymers And Biopolymers For Separation Of Solid Particles Of High Rate Thickeners In Mineral Processing Industries	Ministry Of Mines	Dr Rakesh K Yasarla
2	Investigation On Identification And Biochemical Validation Of Selenoproteins From Nannochloropsis Oceanica CASA CC201 As Functional Food/ Feed Supplements	SERB	Dr Muthu Arumugham
3	Biotechnological Approaches Promising Grains And Food Free Of Fusarium Mycotoxins	DST	Dr Madhavan Nampoothiri
4	Assembly Of Synthetic Cell In A Microfluidic System With Tunable Membrane Potential	DST	Dr Harsha Bajaj
5	Building Artificial Cells With Genetic Information For Regulated Communication	DST	Dr Harsha Bajaj
6	Omega-3- Fatty Acid Enriched Edible Algal Biomass As Feed Supplements	DBT	Dr Muthu Arumugham
7	Bio Refinery Approach In Recovering High Value Products From Vegetable And Fruit Wastes Under Circular Economy Frame	DST Indo Italy	Dr P Binod
8	Bioactive Pectic Oligosaccharides Production From Fruit Wastes Using Onsite-Developed Endogenous Enzyme System - A Tailor-Made Green Process To Improve The Functionality Of Prebiotics	SERB	Dr Pinaki Dey

9	Development Of Antimicrobials Targeting Bacterial Cellular Membrane To Combat Multi-Drug Resistance	ICMR	Dr Harsha Bajaj
CHEMICAL SCIENCES & TECHNOLOGY DIVISION			
1	Fluorescent Molecules And Assemblies For Sensing And Imaging(J C Bose Fellowship)	DST	Dr A Ajayaghosh
2	Novel Strategies For The Generation Of Long Lived Photo Induced Charge Separated States In Donor-Acceptor Systems	SERB	Dr V Karunakaran
3	Development Of Quantum Chemical Descriptor (QCD) Based Method For Screening	SERB	Dr C H Suresh
4	Design And Synthesis Of Novel Iminosugar Variants And Their Cationic Amphiphiles As Antiviral Therapeutics Against Dengue Virus (DENV)	DBT	Dr L Ravishankar
5	Nano Mechanical Response In Organic Crystals: Molecular Basis Of Mechanically Induced Structural Transformations	SERB	Dr Sunil Varughese
6	Synthesis Of A Novel Lipid-Linked Oligosaccharide And Its Evaluation As Vaccine Adjuvant	SERB	Dr L Ravishankar
7	Experimental And Theoretical Investigation On Lead Free Perovskites For Opto Electronic Applications	SERB	Dr C Vijayakumar
8	Digitally Connected Tribal Colonies	Medical Electronics & Health Informatics Division	Dr Yoosaf Karuvath
9	Synthesis And Photo Physical Study Of Hybrid Perovskite Materials For High Efficiency Electronic And Optoelectronic Devices	KSCSTE	Dr C Vijayakumar
10	Mixed-Dimensional And Hybrid Bilayered Perovskites For High Stability And High Efficiency Photovoltaic Devices	DST Indo Israel	Dr Ishita Neogi
11	Lead Free Hybrid Perovskites Incorporated With Organic Charge-Transfer Complexes For Photovoltaic Application	SERB	Dr C Vijayakumar
12	Development Of A Sandwich Model Magnetic Capture System For The Detection Of Pancreatic Cancer Biomarkers In Serum By SERS Based Immune Assay	DHR	Dr Vishnu Priya Murali
13	An Integrated Target Specific Inhibition Of Acetylcholinesterase, Phosphodiesterase-5 AndAmyloid-Beta Aggregation For Alzheimer's Disease Through Phytotherapeutic Approach	ICMR-DHR	Mr Anand Ganapathy

14	Organic- Inorganic Hybrid Nanomaterials For Non- Conventional Energy Technologies	Nano Mission, DST	Dr Sujatha Devi
15	Base Controlled Diversity Synthesis Of Spiro-Indolinone Hybrids Of Medicinal Relevance	SERB	Dr B S Sasidhar
16	Diagnostic Evaluation Of A SERS-Nanoprobe Based Immunosensor For Early Detection Of Alzheimer's Disease Biomarkers From Blood	ICMR	Dr K K Maiti
17	Investigation Of Ultrafast Dynamics Of Chromophores Exhibiting Thermally Activated Delayed Fluorescence For Oleds	BRNS	Dr V Karunakaran
18	Exploring Lead Free Hybrid Perovskite Materials For Neuromorphic Computing	DST	Dr C Vijayakumar
19	Technology For The Early Detection Of Cancer From Blood Sample Using SERS (Surface Enhanced Raman Spectroscopy) And Artificial Intelligence - A Novel Technique	Tata Elxsi Limited	Dr K K Maiti
20	Illustration Of Excited State Symmetric Breaking In The Multiple Electron Donor-Acceptor Materials Using Ultrafast Time- Resolved Infrared Spectroscopy	SERB	Dr V Karunakaran
21	Stable, Dopant-Free And Cost-Effective Hole Transporting Materials For Perovskite Solar Cells: Probing Interfacial Charge Transfer Dynamics In N-I-P &P-I-N	SERB	Dr Joshy Joseph
22	Synthesis Of Polyhydroxylated Pyrrolidine Iminocyclitol-Based Novel Antivirals Against Dengue Virus (File No. VIR/17/2020/ECD-I)	ICMR	Dr L Ravishankar
23	Isolation And Exploration Of Phytochemicals Against Obesity And Related Complications	KSCSTE	Dr B S Sasidhar
24	Revealing Ultrafast Charge Transfer Dynamics Controlling The Efficiency Of Photo Functional Materials: A Combination Of Femtosecond Pump Probe And Time- Resolved Electron Paramagnetic Resonance Spectroscopies	DST Indo German	Dr V Karunakaran
25	Printable Carbon Electrodes Replacing Gold: A Concept To Accelerate Development Of Cost Effective AndScalable Perovskite Solar Cells For Outdoor/Indoor Photovoltaic Applications	KSCSTE	Dr Suraj Soman
26	Multi Resonance & Horizontally-Oriented Blue TADF Emitters From Materials To Device Engineering	DST Indo German	Dr Ishita Neogi

27	Design AndDevelopment Of Functional Heteroacenes AndHeteroacene Incorporated Dyes For Indoor/Ambient Light Harvesting Applications	SERB	Dr Jubi John
28	Design, Synthesis Of Novel Naphthalene-Bipyridine Appended Iridium (Nap-Ir) Photosensitizer For Targeted Nanoparticle Based Phototherapy In Breast Cancer Model	SERB	Dr K V Radhakrishnan
29	Development Of Spectro-Cytology Screening Technology For Detection Of Grades Of Cervical Cancer Lesions By Surface Enhanced Raman Scattering(SERS) And Artificial Intelligence	ICMR	Dr K K Maiti
30	A Sustainable Approach For Oleo Chemicals Production From Agro And Industrial Residues Using Non-Conventional Oleaginous Yeast And Fungi	SERB	Dr P A Balakumaran
31	Poly-Gama-Glutamic-Acid And Its Blends As Biodegradable Material And An Alternative To Single Use Plastics	DBT	Dr P A Balakumaran
CENTRE FOR SUSTAINABLE ENERGY TECHNOLOGIES			
1	Cost-Effective Fabrication Of White OLEDS For Solid-State Lighting: How To Address Process Complexity And Optimal Usage Of Materials	SERB	Dr K N Narayanan Unni
2	Tuning Electrochemical Pathways In New- Generation Electrochromic Materials For Secondary Energy-Sourcing	SERB	Dr Biswapriya Deb
3	Probing Interfacial Device Dynamics In Highly Efficient Copper Electrolyte Based Dye-Sensitized Solar Cells For Indoor Photovoltaics	SERB	Dr Suraj Soman
4	IC-MAP Collaborative Research For Accelerated Development Of Materials And Devices For Energy Harvesting And Conservation Technologies (CRADMET)-Energy Efficient Buildings (EEB)	DST	Dr P Sreejith Sankar
5	IC-MAP Collaborative Research For Accelerated Development Of Materials And Devices For Energy Harvesting And Conservation Technologies (CRADMET)- ADAAPT- Accelerated Development Via Automation AndAl Of Perovskite Solar Cell Technology	DST	Dr Suraj Soman
6	Design And Development Of Optics Integrated Rooftop Agrivoltaics	ANERT	Dr Adersh Asok
7	Solar Hybrid Indoor Light Harvesters For Self-Powered Iot Applications	DST	Dr Suraj Soman

8	Hybrid Electrochromic Materials And Devices For Multifunctional Smart Applications	KSCSTE	Dr P Sreejith Shankar
9	Automation And Al/ML Assisted Development Of Solid State Battery Technology (WP:NMC Cathode For Li-Ion Batteries)	DST	Dr R B Rakhi
10	Non Precious Metal Oxide Carbon Hybrid Electro Catalyst For Oxygen Reduction Reaction	SERB	Dr K G Nishanth
MATERIALS SCIENCE & TECHNOLOGY DIVISION			
1	Development Of Sustainable Pressure Sensitive Adhesives From Bio-Sourced Pre-Polymers: A Green Alternative For Semi-Structural Applications	SERB	Dr S K Sahoo
2	Development Of Iridium Coating Over Carbon-Carbon Composites For Space Applications	ISRO	Dr S S Sreejakumari
3	Recovery Of Scandium , TiO2 And Iron From Red Mud Wastes Of Aluminum Industries	SERB	Dr K Jayasankar
4	Pilot Scale Squeeze Casting Technology Development Of High Strength Aluminium Alloy Products For Strategic And Automotive Applications	DST	Dr M Ravi/ Dr T P D Rajan
5	Development Of Wearable Electronic -Skin Patch For Real -Time Monitoring Of Human Health Parameters And Tactile Sensing	DST	Dr Achu Chandran
6	Development Of LTCC Tapes And Compatible Gold Pastes For Space Application	ISRO	Dr K P Surendran
7	Design And Development Of Flexible Polymer/Biopolymer Based Aerogels For Thermal And Acoustic Insulation	SERB	Dr E Bhoje Gowd
8	Synthesis And Development Of Multifunctional Benzoxazines From Agro Residues And Its Polymer Composites As High Performance Materials	DBT	Dr K I Suresh
9	Copper Coating On Poxy Carbon Composite For Radio Frequency Reflector Antennas	ISRO	Dr T P D Rajan
10	Indigenization Of Printable Conductive Gold Technologies For Electronic Applications	DST	Dr K P Surendran
11	Advanced Near Net Shape Manufacturing Technology Of Aluminium Alloy And Composite Components For Thermal Management Applications	DST	Dr T P D Rajan
12	Low-Cost Conductive Inks For Affordable RFID Applications	SERB	Dr K P Surendran

13	Synthesis And Development Of Hybrid Carbon Nanocomposites And Polymer Emulsions As Flocculants For Mining Industry	Ministry Of Mines	Dr K I Suresh
14	Novel Material Manufacturing Method For Large Volume Cast Metal Matrix Nanocomposites (Ultra-Cast)	Ministry Of Mines	Dr T P D Rajan
15	Moisture Resistant, Food Compatible Bio-Resin Coated Paper For Food Packaging With Repulpable Potential	BIRAC	Dr S K Sahoo
16	Development Of Molten Regolith Electrolysis Process For Oxygen Production From Simulated Lunar Soil	ISRO	Er J Venkatesan
17	Development Of Self-Healing Refractory And Investigation On The Mechanism	ISRO	Dr Jayasankar
18	Development Of Environmentally Benign Inhibitor Intercalated 2D Mica Nanosheet Pigments For Metal Protective Hydrophobic Coating	DST	Ms Nithya
19	Development Of Smart Multi-Functional Nanoceria Incorporated Hydroxypatite/Strontium Phosphate Composite Coating On Anodized Mg Alloy For Temporary Implant Applications	DST	Dr Simi
20	Highly Flexible, Self-Responsive And Bio Based Polymeric Hydrogel Composite Films With Energy Efficient NIR Shielding Property	SERB	Dr S K Sahoo
21	Technology For Rare Earth Added Aluminium Alloys And Products For Aerospace, Marine , Energy And Automotive Applications	IREL, Mumbai	Dr T P D Rajan
22	Aluminium-Magnesium Based Bimetal Castings For Light Weighting Applications Through Centrifugal Casting Technique	DST -AMT	Dr A Srinivasan
23	Processing Of Cerium Sulphide Red Pigment From Ferrous Carbonate Precursor Produced By IREL	IREL, Kollam	Dr S Ananthakumar
24	Spray Pyrolysis Based Bench Scale Synthesis Of Morphologically Tuned Porous Electrode Materials For Energy Applications	DST	Dr U S Hareesh
25	Pilot Plant Extraction Of Rare Earth Elements (Scandium, Neodymium &Europium) From KMML Titanium Industrial Waste	Ministry Of Mines	Dr M Sundararajan
26	Development Of Composition Tolerant Reusable Aluminium Alloys By Recycling Metallic Waste	SERB	Dr Parijat Pallab Jana

27	High Entropy Mechanical Energy Scavenging Through Piezo-Tribo-Hybrid Nanogenerators Derived From Waste Materials Aiding Circular Economy For Self-Powered Electronics	SERB	Dr Achu Chandran
ENVIRONMENTAL TECHNOLOGY DIVISION			
1	Pilot Scale Demonstration Of A Technology For Remediating Community Well Water Contaminated With An Emerging &Endocrine Disrupting Micro Pollutant Perchlorate	Jal Jeevan Mission	Dr B Krishnakumar
2	Upgradation Of Food Testing Laboratory (MoFPI-FTL)	Ministry Of Food Processing Industries (MoFPI)	Dr K P Prathish
3	Pilot Scale Demonstration Of A Comprehensive Approach To Recover High Value Products From Waste Banana Pseudo Stem	DST	Dr B Krishnakumar
4	Implementation Of A Sustainable Bioenergy Based Model Effluent Treatment Plant Desiccated Coconut Industries	DST	Er T Dhani Babu
5	Investigation On Operational Efficiency Of Industrial Gas Bio Filters	KSPCB,TVM	Dr Partha Kundu
6	Forward Osmosis Assisted Concentration Of Reject Of Reverse-Osmosis For Possible Bypassing Of MEE	KLF	Dr Akshay Shende
7	Review And Update Of National Implementation Plans (Nips) Under The Stockholm Convention (SC) On Persistent Organic Pollutant (Pdps) For India	GEF-UNEP	Dr K P Prathish
8	Brahmapuram Fire Incident 2023: Hazardous Chemical Emission Assessment And Mitigation Plans	KSPCB	Dr K P Prathish
9	Study On Techno-Validation Of Odour Control Facility Of Poultry Rendering Unit (Stage-1)	M/S Organo Fertilizers (India) Pvt Ltd	Dr Partha Kundu
10	Hydro Dynamic Cavitation Assisted Fractionation Of Coconut Waste Shell To MCC And Its Conversion To LGO	CDB	Er T Dhani Babu
11	Review Update On Biomedical Waste Management In Kerala State	KSPCB	Dr C Kesavachandran
12	Development Of Accelerated Biodegradation (Aerobic And Anaerobic) Testing Method For Biodegradable Plastics	DBT	Dr Partha Kundu
13	Study On Assessment Of The Air Pollution Load And Emission In Old And Modern Plywood Manufacturing Units In Kerala	KSPCB	Dr Partha Kundu

14	Chitan-Glucan Complex Nanofibers From Fungal Mycelium And Their Implication Of Biomaterials Through Tuning Of Surface And Mechanical Properties	SERB	Dr K C Sherpa

CSIR PROJECTS 2023-24

Sl No	Theme	Category	Project Title	Project Leader
1	EED	**FIRST**	Near Infrared Emission From Organic Light Emitting Diodes: Novel Design Strategies	Dr Narayanan Unni
2	E3OW	**FTC**	Field Testing And Validation Of A Modular Onsite Wastewater Treatment & Resource Recovery Unit	Dr B Krishnakumar
3	4M	**FTT**	Utilization Of Ilmenite Mineral Industrial Sludge From TiO_2 Pigment Industry For Making Coloured Ceramic Tiles Via Low-Energy Sintering Process	Dr S Ananthakumar
4	ANB	**FTT**	Effective Utilization Of Agro Residues For Development Of Biomaterials Based Leather Substitute - Process Optimization And Scale Up Studies	Dr Anjineyalu Kothakota
5	CLP	**FTT**	DSSC Technology For TV & AC Remotes: Import Substitution, Scale-Up And Benchmarking Of Potential Metal–Free Organic Dyes And Copper Electrolytes	Dr Suraj Soman
6	CLP	**FTT**	Thermo Responsive Specialty Chemicals For Large Area Smart Facades And Windows	Dr Sreejith Shankar
7	CLP	**FTT**	Fluorescent Pigments With Magnetic Response For Security Printing	Dr C Vijayakumar
8	CLP	**FTT**	Greener And Sustainable Process To Convert Waste Banana Stem Into Nanocellulose	Dr Saju Pillai
9	CLP	**FTT**	Bio Based Polyurethanes And Hybrid Nanocomposite Dispersions For Application In Leather Finishing	Dr K I Suresh
10	E3OW	**FTT**	Sustainable Geo Composite Drainage-Root Barrier Systems For Green Highways	Dr Saju Pillai
11	E3OW	**FTT**	Development & Demonstration Of 10 Tpd Clean Sustainable Municipal Solid Waste(Msw)	Dr Partha Kundu
12	EED	**FTT**	Pre-Commercialization Feasibility Studies And Building Integration Of Multifunctional Dynamic Window Panels	Dr Biswapriya Deb
13	EED	**FTT**	Systems Engineering Of Dynamic Power Window Technology	Dr Adersh Asok
14	EED	**FTT**	Indigenous Development Of Processes And Materials For Highly Efficient And Stable Perovskite Solar Cell Technology	Dr Narayanan Unni

15	VVM	**FTT**	Development Of Thermo Responsive Materials As Vaccine Viral Monitors	Dr P Sreejith Shankar
16	4M	**HTC**	Development Of Scale Up Synthesis Strategies For Short, Modified Oligoribonecleotide Therapeutics (Syn-Oligo Rna)	Dr Joshy Joseph
17	Agro Mission	**Mission Mode**	Innovative Processes And Technologies For Crop Protection Chemicals	Dr L Ravishankar
18	CCUS	**Mission Mode**	Carbon Dioxide Capture And Utilization From Point Sources Of Steel Industry	Dr U S Hareesh
19	COVID	**Mission Mode**	Discovery & Pre-Clinical Development Of Antivirals For Covid-19 & Other Diseases	Dr Jubi John
20	Health care	**Mission Mode**	Active Pharmaceutical Ingredients For Affordable Health Care (Api-Ahc)	Dr Jubi John
21	Health care	**Mission Mode**	Phenome India- Csir Health Cohort Knowledgebase	Dr Rajeev K Sukumaran
22	Jigyasa	**Mission Mode**	Jigyasa 2.0 Programme With The Concept Of Virtual Lab Integrated (Cjvl)	Dr Joshy Joseph
23	SHRI ANNA	**Mission Mode**	Millet - Sustaining Health Through Research And Innovation By Analysis Of Nutrients And Nutraceuticals To Achieve Global Awareness (Shri Anna)	Dr V V Venugopal
24	WTW	**Mission Mode**	Sustainable Technologies For The Safe Utilization And Recycling Of Non-Metallic Ilmenite Mineral Industrial Wastes/Technology Development For Recovery Of Tantalum From Secondary Resources (Retan)/Waste To Wealth : Comprehensive Solutions Towards Circular Economy And Sustainability	Dr S Ananthakumar/ Dr K Jayasankar/ Dr P Sreejith Sankar
25	Energy	**Mission Mode**	Development Of Advance Materials And Devices For Opto-Electronic, Biomedical And Strategic Applications	Dr Biswapriya Deb
26	Energy	**Mission Mode**	Hydrogen Technology (H2t)	Dr Satyajit Shukla
27	Skill Development	**Network**	CSIR Integrated Skill Initiative Phase II	Mr V Moni

PROJECTS FUNDED BY INDUSTRIES

No.	Title	Organization	Project Leader
	SPONSORED PROJECTS		
1	Development Of Friction Dust Resin From Cashew Nut Shell Liquid.	M/S Sree Krishna Industries	Dr K I Suresh
2	Technology For The Production Of Crema (Coffee) With Improved Foam Retention Time	Tata Coffee Limited,Bengaluru	Dr C Anandharama krishnan

3	Development Of A Scalable Manufacturing Process For Mct Oil From The Deoderized Distillate Of Palm Kernel Oil And Coconut Oil.	Crestchem Ltd	Dr P Nisha & Dr. Vasanth Ragavan
4	Chemo Profiling And Quantification Of A Botanical Extract (Aqueous Alcoholic Extract Of Rosemary Leaves)	M/S Avt Natural Products Pvt Ltd	Dr L Ravi Shankar
5	Research And Development Of Improved Aluminium Material For Scroll Applications	Atlas Copco	Dr M Ravi/ Dr T P D Rajan
6	Development Of Natural Fibre- Based Biodegradable Food Packaging Containers	ITC Limited	Dr Saju Pillai
7	Development Of Cost-Effective IR Reflective Ceramic Colorants For Polymer Coatings	Pidilite Industries Ltd	Dr S Ananthakumar
8	Feasibility Studies On The Recovery Of Nickel And By Products From Spent Electroless Nickel	Enviro Metals Recyclers Pvt Ltd	Mr J Venkatesan
9	Feasibility Studies On The Recovery Of Palladium, Platinum, Rhodium From Catalytic Converter And Recovery Of Li, Co, Mn, Ni From Spent Li Ion Batteries (Laptop/Mobiles Batteties/Black Mass)	Enviro Metals Recyclers Pvt Ltd	Dr K Jayasankar
10	Process Development And Validation Of Kaolin Clays And Industrial Products For Niche Market	Narmada Kaolin Pvt Ltd	Dr S Ananthakumar
11	Development Of Brown Fused Alumina From The Non- Metallurgical Grade Bauxite Of Indian Origin And Its Characterization	Hindalco Industries Ltd	Mr J Venkatesan
12	Feasibility Assessment For Bioethanol Production From Water Hycinth Biomass	K-Disc	Dr K Rajeev Sukumaran
13	Process Development Of A Novel Probiotic Yeast	Abode Biotech India Ltd	Dr P Binod
14	Fermentation Of Fresh Turmeric And Production Of Fermented Turmeric Powder (Ftp) With Better Solubility And Improved Palatability	Abrin Aldrich Agronicproducts Pvt Ltd	Dr K Rajeev Sukumaran
15	Material Evaluation Using Advanced Surface Characterizations (XPS)	Momentive Performance Materials Pvt Ltd	Dr. Saju Pillai
16	Development Of High - Pressure Die Cast Aluminium Alloys And Extrusion Alloys	Hindalco Industries Limited	Dr M Ravi/ DrParijat Pallab Jana
17	Development Of Knowledge Base On Pharmaceutical Formulations	Ksdp Ltd	Dr A Kumaran
18	Phytochemical Evaluation Of Formulations	Pankajakasthuri Herbal Foundation	Dr P Nisha
CONSULTANCY PROJECTS			
1	Material Evaluation Using Advanced Surface Characterizations	IIST Valiyamala	Dr Saju Pillai
2	Preparation Of Homogeneous Solution Of Four Compounds (1) Squalene, (2) Oxyresveratrol, (3) Linoleic Acid (4) Vitamin E In Squalane Base	M/S Sira Naturals	Dr A Kumaran
3	Technical Evaluation Of Stp Installed By Kwa At Thiruvananthapuram	Kerala Water Authority	Dr Akshay Shende

4	Preparation Of District Survey Report For Riverbed Or Sand Mining In Kollam District (Kulathupuzha River)	Divisional Forest Officer(DFO)	Er Sravanth Tangellamudi
5	Design Of 10 Kld Nowa Unit For A Medium Scale Bakery Unit For Wastewater Treatment & Recycling	Jaihari Food Products	Dr B Krishnakumar
6	Structural Studies Of Polysiloxanes Using Variable Temperature Small- Angle And Wide- Angle X-Ray Scattering	Momentive Performance Materials Pvt Ltd	Dr E Bhoje Gowd
7	Validation Of Owc For Suchitwa Mission	Vikas Ecosystems Pvt Ltd	Dr B Krishnakumar
8	Validation Of Owc For Suchitwa Mission	Waste Is Gold Pvt Ltd , Bangalore	Dr B Krishnakumar
9	Characterization And Assessment Of Lithium Content From Indian Ores: Phase -I	JSW Steel Limited	Er J Venkatesan
10	Feasibility Studies On The Development Of No-Reactive, Non-Wetting Coating For Molten Transport.	M/S Tata Metaliks	Dr U S Hareesh
11	Analysis And Interpretation Of Dioxins Furans Pcbs, Heavy Metals In Fishand Fish Products	Fish Oil Companies	Dr K P Prathish
12	Eia Study For Ire -Block-III-Ext	KMML	Er Saurabh Sakhre
13	Study On Dioxins And Furans Emmission In Air , Ash/ Soil Samples In Industrial Plasma Gasifier	BARC	Dr K P Prathish
14	Study On The Emission Of Dioxins, Furans, Pcbs And Heavy Metals In Ambient Air,Soil,Sediments And Vegetation Samples Collected During The Fire Breakout Incident At Image , Palakkad	KSPCB	Dr K P Prathish
15	Preparation Of District Survey Report For River Bed Mining In The State Of Kerala	Institute Of Land And Disaster Management (ILDM)	Er Saurabh Sakhre
16	Analysis And Interpretation Of Arsenic, Lead, Cadmium AndMercury In Ayurvedic Formulations	Pankajakasturi Herbals India Pvt Ltd	Dr K P Prathish
17	Pilot Scale Feasibility Trials On Bioethanol Production From Starch	Spac Starch Products Pvt Ltd	Dr K Rajeev Sukumaran
18	Consultancy To Set Up Processing Line For Matured Coconut Water Concentrate	AFSC Bank	Er V V Venugopal
19	Asessment Of Heavy Fluvial Minerals In Lean Mineral Production Area	M/S Mkn Bricks And Blue Metals (P) Ltd	Dr M Sundararajan
COLLABORATIVE PROJECTS			
1	Qualitative Evaluation Of The Impact Of Treated Biomedical Waste On Selected Soil Parameters	M/S Bio Vastum Solutions Pvt Ltd	Dr P Sreejith Shankar
2	Development Of Additive Manufacturing /3d Printing Technique Or Polyurethane Encapsulation Of Conformal Arrayhydrophone	NPOL, DRDO	Dr K I Suresh

3	Centre Of Excellence For Lightweight Material Technologies	Wabco India Limited	Dr T P D Rajan
4	Indigenous Development Of Aluminum-Silcon Carbide Metal Matrix Composites	ADE, DRDO	Dr T P D Rajan
CSR-GAP PROJECTS			
1	Technology For The Early Detection Of Cancer From Blood Sample Using SERS (Surface Enhanced Raman Spectroscopy)	Tata Elxsi Limited	Dr Kaustabh Kumar Maiti
2	Establishment Of Pineapple Leaves Processing Unit For Biodegradable Tableware Manufacturing	Vazhakulam Agro AndFruit Processing Company Ltd	Dr K Anjineyulu
3	Study On Techno- Validation Of Odour Control Facility Of Poultry Rendering Unit (Stage -1)	Organo Fertilizers	Dr Partha Kundu
4	Estimation Of Residual Sulphur In Copra Coconut Oil Samples	M/S KLF Nirmal Industries (P) Ltd	Dr P Nisha

Memorandum of Understanding Entered

No.	Title	Nature Of The MoU	Name Of The Firm/ Firms	Project leader
1	Technology For The Production Of Crema (Coffee) With Improved Foam Retention Time	Agreement For Sponsored Research	TATA Coffee Limited, Bengaluru	Dr C Anandharamakrishnan
2	The Development And Commercialization Of Electrochromic "Smart" Glasses	NDA	Saint Gobain India Pvt. Ltd., Chennai	Dr Biswapriya Deb
3	Preparation Of District Survey Report For Riverbed Or Sand Mining In Kollam District (Kulathupuzha River)	Agreement For Project	Divisional Forest Officer (DFO)	Mr Sravanth Tangellamudi
4	Environmental Exposure And Its Health Effects, Physiological Based Pharmacokinetic Modelling And Simulation (PBPK Models), Risk Assessment Models And Skill Development Program	Agreement For Research Collaboration	Indian Institute Of Technology (IIT), Hyderabad	Dr C Kesavachandran
5	Detailed Scientific Analysis Of Different Compounds Isolated From Medicinal Plants And Development Of Pharmaceutical Formulations For Health And Treatment Of Various Ailments And Further Value Addition On Their Products	Agreement For Research Collaboration	The Dale View College Of Pharmacy And Research Centre, Thiruvananthapuram	Dr A Kumaran

6	Processing Of Cerium Sulphide Red Pigment From Cerrous Carbonate Precursor Produced By IREL	Agreement For Sponsored Research	IREL Technology Development Council	Dr S Ananthakumar
7	Technology For Rare-Earth Added Aluminium Alloys And Products For Aerospace, Marine, Energy And Automotive Applications	Agreement For Sponsored Research	IREL Technology Development Council, Odisha	Dr T P D Rajan
8	Faculty And Student Exchange Program For The Mutual Benefit By Utilizing The Expertise And Infrastructure Existing In Both Institutions	Agreement For Research Collaboration	KSCSTE, Thiruvananthapuram.	Mr R S Praveen Raj
9	To Establish A Mutual Framework Governing The Respective Organizational Relationships, Responsibilities And Research Collaboration	Agreement For Research Collaboration	Fatima Mata National College (FMNC), Kollam	Dr Kaustabh Kumar Maiti
10	Non Disclousure Agreement	NDA	Silres Energy Solutions Pvt. Ltd., Chennai	Dr Adersh Asok
11	Feasibility Studies On The Development Of Non-Reactive, Non-Wetting Coatings For Molten Metal Transport	Agreement For Sponsored Research	Tata Metaliks,Kolkata	Dr U S Hareesh
12	Indigenous Development Of Processes And Materials For Highly Efficient And Stable Perovskite Solar Cell Technology	Agreement For Project	HHVAT (HHV Advanced Technologies Private Limited), Bangalore	Dr Narayanan Unni
13	Hydrodynamic Cavitation Assisted Fractionation Of Coconut Waste Shell To MCC AndIts Conversion To LGO	Agreement For Project	Coconut Development Board (CDB)	Er T Dhani Babu
14	Chemical Testing	Extension Of Agreement	Envirodesigns Eco Labs, Ernakulam, Kochi	Er Sravanth Tangellamudi / Er J Ansari
15	Knowhow And Technical Guidance To ADC For The Fabrication Of The Equipment	Knowhow-Agreement For The Automation Of Equipment	Antony David And Co., Thrissur	Dr P Sreejith Sankar

16	To Establish The Initial Framework For Cooperation Between IPS Academy, Institute Of Engineering &Science, Indore AndCSIR-NIIST	Agreement For Research Collaboration	IPS Academy, Institute Of Engineering &Science, Indore	Mr Saurabh Sakhre
17	Technological Interventions And Capacity Building For Empowering People Of Kerala Connected With Agriculture, MSME, SHG Etc.	Agreement For Capacity Building	Kerala Khadi And Village Industries Board (KKVIB)	Dr M V Reshma
18	Development Of Carbides, Nitrides And Borides From Oxides/Minerals And Its Characterization	NDA	Carborundum Universal Limited (Cumi), Chennai	Dr K Jayasankar
19	Collaboration In The Areas Of Mutual Interests Like Microbial Processes And Synthesis Of Various Types Of Biopolymer Synthesis And Production Of Plant Based Nano Cellulose And The Production Of Nano Cellulose Using Bacterial Origin	Agreement For Research Collaboration	Mahatma Gandhi University (MGU), Kottayam	Dr Pinaki Dey
20	Development Of A Clean Sustainable MSW Technology: 10 TPB Pilot Plant For Management Of Municipal Solid Waste	Agreement For Project	Center For Environment AndDevelopment (CED), Thiruvananthapuram & Nedumangad Municipality, Nedumangad Town, Thiruvananthapuram	Dr Partha Kundu
21	Review And Update On Biomedical Waste Management In Kerala State	Agreement For Gap Analysis	Kerala State Poluttion Control Board, Thiruvananthapuram	Dr C Kesavachandran
22	To Conduct Joint Collaborative Research, Undertake Multi Centric Research Projects And Promote Inter-Institutional Cooperation	Agreement For Research Collaboration	Department Of Biotechnology, University Of Calicut, Malappuram	Dr L Ravi Shankar
23	Collaboration In The Areas Of Mutual Interest	Agreement For Research Collaboration	Sree Chitra Thirunal College Of Engineering, Thiruvananthapuram	Dr K Madhavan Nampoothiri
24	Evaluation Of The Feasibility Of A Business Relationship Between The Parties And Shall Include Exchange Of Business And Market Information	NDA	Raini Industries India Private Limited, Chennai	Dr Adersh Asok

25	Technology For The Early Detection Of Cancer From Blood Sample Using SERS (Surface Enhanced Raman Spectroscopy) And Artificial Intelligence - A Novel Technique	Extension Of Agreement	Tata Elxsi Limited,Bangalore	Dr Kaustabh Kumar Maiti
26	To Explore The Possibility Of Bridging A Cooperation In Research And Developmental Activities	Agreement For Research Collaboration	Rubber Research Institute Of India (RRII), Kottayam	Dr K I Suresh
27	Manufacturing Building Bricks Utilizing Waste Foundry Mould Sand Generated By Peekay Steel Ltd.	Technology Transfer	M/S Peekay Steel Ltd , Coimbatore	Dr S Ananthakumar
28	Research Collaborations In The Area Of Spice Processing, Functional Foods, AndNutraceuticals	NDA	M/S Aurea Biolabs Private Limited	Er V V Venugopal
29	Research Collaborations In The Area Of Food &Nuetraceuticals	NDA	M/S Akay Natural Ingredients Private Limited,Cochin, Aluva	Er V V Venugopal
30	To Provide A Solution For Improving The Pathogen Removal Efficiency Of CBSF	Agreement For Project	Mr. Adarsh P. Kumar, Partner, Hydronest,Thiruvalla, Pathanamthitta	Dr S V Shukla
31	Development Of Accelerated Biodegradation (Aerobic And Anaerobic) Testing Method For Biodegradable Plastics	Agreement For Project	Department Of Biotechnology, New Delhi	Dr Partha Kundu
32	To PromteAnd Develop Co-Operations In The Field Of Science And Technology And Inter Disciplinary Research Between The Two Institutions.	Agreement For Research Collaboration	KSPCB, Thiruvananthapuram	Dr C Kesavachandran
33	Development Of A Scalable Manufacturing Process For MCT Oil From The Palm Kernel Oil Deodorizer Distillate (PKODOD) Or (PAKODA) Also Known As Palm Kernel Fatty Acid Distillate And From Coconut Oil Deodorizer Distillate (CODOD)	Agreement For Sponsored Research	M/S Crestchem Ltd,Gujarat	Dr P Nisha

34	To Improve Employability Of People In Kerala In General And To Provide Gainful Employment In Particular Through Industry Oriented Long-Term And Short-Term Skill Development Programmes	Agreement For Academic Collaboration	Kerala Development And Innovation Strategic Council, Thiruvananthapuram	Mr V Moni
35	Collaboration On Academic, Research Activities, Technology Incubation, Diffusion And Entrepreneurship Development.	Agreement For Capacity Building	National Innovation Foundation, Bengaluru	Mr R S Praveen Raj
36	Assessment Of Heavy Fluvial Minerals In Lean Mineral Production Area	Agreement For Sponsored Research	M/S MKN Bricks &Blue Metals (P) Ltd,Trivandrum	Dr M Sundararajan
37	Material Transfer Agreement For The Project, Sustainable Geocomposite Drainage-Root Barrier Systems For Green Highways	Material Transfer Agreement	M/S Virendera Textiles, Noida	Dr Saju Pillai
38	A System And A Method For Onsite Wastewater Treatment And Resource Recovery (NOWA)	Technology Transfer	Mr. Ahammed Sufiyan O.P,M/S Reebon Solutions,Campus (Via), Calicut	Dr B Krishnakumar
39	Human Resource Utilization, Facility Utilization, Technology Support Services, And Consultancy Services, Collaborative Research Works In The Field Of Light Alloys	Agreement For Research Collaboration	Hindustan Aeronautics Limited (HAL), Bengaluru	Dr A Srinivasan
40	To Collaborate In The Field Of Multicenter Clinical Research AndBasic Research, Faculty And Student Exchange Program For The Mutual Benefit By Utilizing The Expertise And Infrastructure Existing In Both Institutions	Agreement For Research Collaboration	Pushpagiri Research Centre, Thiruvalla Kerala	Dr P Binod
41	Study On Assessment Of The Air Pollution Load And Emission In Old And Modern Plywood Manufacturing Units In Kerala	Agreement For Project	KPCB, Thiruvananthapuram	Dr Partha Kundu

42	Jointly Developing Biomass- Based Leather Alternates And Other Related Materials And Chemicals	NDA	M/S Alt Materials Innovations Pvt. Ltd., Bangalore	Dr P Binod
43	Agreeement For The Recognition Of National Reference Laboratory	Agreement	FSSAI, New Delhi	Dr K P Prathish
44	To Engage In An Exchange Of Confidential Information To Explore The Development Of Adjustable Transparency Of Automotive Glasses By Using Thermochromic Or Electrochromic Dye Or Ink	NDA	M/S Tata Motors, Mumbai	Dr Biswapriya Deb
45	Poly-Gamma-Glutamic-Acid And Its Blends As Biodegradable Material And An Alternative To Single Use Plastics	Agreement For Project	DBT,New Delhi	Dr P A Balakumaran
46	To Investigate The Impact Of Biomedical Waste Treated Using NIIST Technology On Selected Soil Parameters, Under A Collaborative Platform	Agreement For Research Collaboration	M/S Bio Vastum Solutions Pvt. Ltd. Angamaly South, Ernakulam	Dr P Sreejith Shankar
47	To Exchange And Discuss Certain Non-Public, Confidential Or Proprietary Information With Each Other In Connection With A Potential Business Relationship	NDA	Ql Space Pvt. Ltd.,Australia,	Dr S V Shukla
48	Design Of Point-Of-Care Diagnostic Materials, Platforms AndDevices For Biomedical AndEnvironmental Applications	Agreement For Research Collaboration	Manipal Institute Of Technology, Manipal AndManipal School Of Life Sciences, Manipal (MAHE)	Dr Kaustabh Kumar Maiti
49	Development Of Test Methodology To Estimate Residual Sulphur In Copra AndCoconut Oil Samples	Agreement For Project	M/S KLF Nirmal Industries (P) LTD., Thrissur	Dr P Nisha
50	Non Disclousure Agreement	NDA	Garrett Motion Engineering Solutions Private Limited, Bengaluru	Mr C K Chandrakanth
51	A Knowhow For Making Coconut Neera Syrup/ Sugarcane Juice Syrup	Technology Transfer	Ms. Dhanya Kiran, D/O Shri Parameshwaran.K Proprietor, Nutriwadi Natural Foods International, Thrissur	Dr M V Reshma

52	Phytopharmaceuticals For Various Ailments, Biological Testing Services, Phytochemical Markers, Nutraceuticals Process And Products Etc.	NDA	Himalaya Wellness Company (Hwc), Bengaluru	Dr A Kumaran
53	To Strengthen, Promote And Develop Co-Operations In The Field Of Energy & Environment, Agriculture And Allied Sectors, Water And Waste Water Treatment, Training & Development, Etc.	Agreement	M/S UNISON Consultancy Pvt. Ltd.,Kochi	Dr V K Praveen
54	Providing A Description Of The Products And/Or Services That The Joint Venture Is Concerned With	Joint Venture Agreement	M/S Unison Consultancy Pvt. Ltd.,Kochi	Dr Akshay Shende
55	Advanced Research Collaboration Between CSIR-NIIST AndOlusium, Aiming To Foster Innovation And Develop Intellectual Property	Agreement For IP Sharing	M/S Olusium Technologies In Advanced Research, Kanyakumari	Dr Kaustabh Kumar Maiti
56	The Filamentous Fungus – Aspergillus Carbonarius For Production Of The Enzyme(S) And Proposes To Avail The Consultancy Services	Material Transfer Agreement	M/S Sarthak Metals Limited, Nagpur	Dr Rajeev Sukumaran
57	A Process For Production Of The Enzyme – Beta Glucosidase Using Filamentous Fungus Employing Solid State Fermentation	Technology Transfer	M/S Sarthak Metals Limited, Nagpur	Dr Rajeev Sukumaran
58	To Allow CSIR-NIIST To Make And Test Samples Of EATON Proprietary Material And Provide Test Results To EATON	NDA	Eaton India Innovation Center Llp ("Eaton"), Pune	Dr T P D Rajan
59	Preparation Of Mine Plan Including Environmental Management Plan For Potential SandMining Sites Less Than 5 Hectares In Priority Districts Of Thrissur, Palakkad AndMalappuram In Kerala	Agreement For Project	Commissioner, Land Revenue, Thiruvananthapuram	Er T Sravanth
60	Research Collaborations In The Area Of Spice Processing, Functional Foods, AndNutraceuticals	NDA	Plant Lipids	Dr Vasanth Raghavan

61	Technology Transfer For Manufacturing Leather Alternative (Vegan Leather) From Sugarcane Bagasse	Technology Transfer	M/S PA Footwear Pvt. Ltd., Chennai	Dr Anjineyulu Kothakota
62	Preparation Of Homogeneous Solution Of Four Compounds (1) Squalene, (2) Oxyresveratrol, (3) Linoleic Acid (4) Vitamin E In Squalane Base	Agreement For Sponsored Research	Mrs. INDIRA.T, The Managing Partner Of M/S Sira Naturals, Vadakara	Dr A Kumaran
63	Development Of Emulgel Structured Using Passion Fruit Rind Pectin And Xanthan Gum As Plant-Based Alternative To Butter	Agreement For Project	Indian Institute OfTechnology, Hyderabad	Dr P Nisha
64	Developing Advanced Cermaics/Materials, CO2 Capturing Materials, Extraction Of Synthetic Rutile From Ilmenite, Recovering Critical Metals From Industrial Waste And E-Waste AndRare Earth Metal Extraction	NDA	Saarloha Advanced Material Pvt. Ltd., Pune	Er J Venkatesan
65	Strengthening New Developments In The Projects Which Has The Potential To Be Developed To Commercial Products Integrating NIIST Made Indoor Light Harvesting Dye-Sensitized Solar Cells/ Modules	Agreement For Research Collaboration	Embedite Pvt. Ltd., At Thiruvananthapuram	Dr Suraj Soman
66	Development Of Sunlight And Mobile Flash Rechargeable Inorganic Phosphors	NDA	M/S Huebright Colors Pvt. Karnataka	Dr Subrata Das
67	New Greenish Phosphors Which Can Be Activated By Mobile Flash Light, Specifically, Apart From Sunlight	Material Transfer Agreement	M/S Huebright Colors Pvt. Karnataka	Dr Subrata Das
68	The Parties Desire To Have Discussions Of Or Relating To The Confidential Information For The Purpose Of Evaluating A Potential Business Relationship.	NDA	Garrett Motion Engineering Solutions Pvt. Ltd., Bengaluru	Dr A Srinivasan

69	Setting Up A Processing Unit Of Agro-Waste (Field Crop Waste Such As Rice And Wheat Waste) And Manufacture Of Single-Use Biodegradable Tableware Including Plates, Bowls, Tumblers, And Spoons	Technology Transfer	M/S The East Corridor Consultants India Pvt. Ltd., Lucknow	Dr Anjineyulu Kothakota
70	Material (Vegan Instant Tea Premixes (Vegan Tea/ Prebiotic Vegan Tea And Synbiotic /Probiotic Vegan Tea)) Transfer Agreement	Material Transfer Agreement	Mr Vedansh Goyal, M/S Natturz Bio Kontro	Dr P Nisha
71	A System And A Method For Onsite Wastewater Treatment And Resource Recovery (NOWA)	Technology Transfer	Dr. Sanju Thomas M/S Two Degree Climate Control Pvt. Ltd. Ernakulam	Dr B Krishnakumar
72	To Undertake Collaborative R &D Based Research Work On Rubber	Agreement For Research Collaboration	MRF Limited, Chennai	Dr S Ananthakumar
73	A Joint Venture In Order To Collaborate In The Participation Of The Bid Proposals And Execution Of Consultancy Services	Joint Venture Agreement	M/S Unison Consultancy Pvt. Ltd., Kochi	Dr M VReshma
74	Technology Transfer For Setting Up Of Plant For Manufacturing Multi-Use Biodegradable Tableware From Seaweed, Chitosan And Carrageenan	Technology Transfer	Aquagri Processing Pvt. Ltd., Manamadurai	Dr Anjineyulu Kothakota
75	Technology Transfer For Manufacturing Leather Alternative (Vegan Leather) From Seaweed, Chitosan And Carrageenan	Technology Transfer	Aquagri Processing Pvt. Ltd.,Manamaduraii	Dr Anjineyulu Kothakota
76	Precious Metal Extraction By Eco-Friendly Processes	NDA	Green Global Recycling Private Limited, Bangalore	Dr K Jayashankar
77	Feasibility Assessment Of Agro-Residue For Ethanol Production Using ICT's Proprietary Technology, Using Different Biomass Hydrolyzing Enzyme Cocktails	Agreement For Project	Institute Of Chemical Technology, Mumbai (ICT, Mumbai)	Dr Rajeev Sukumaran
78	To Jointly Explore And Undertake Collaborative Research And Development Activities In Areas Of Mutual Interest	Agreement For Research Collaboration	Dr. S Unnikrishnan Nair, Director, VSSC, Thiruvananthapuram	Dr A Srinivasan

79	To Jointly Explore And Undertake Collaborative Research And Development Activities In Areas Of Mutual Interest	Agreement For Research Collaboration	Defence Research &Development Laboratory (DRDL)	Dr A Srinivasan
80	To Establish A Mutual Framework Governing The Respective Organisational Relationships, Responsibilities, And Activities	Agreement For Research Collaboration	Christ University (Deemed To Be University)	Dr Kaustabh Kumar Maiti
81	Agreement For Access And Benefit Sharing	Agreement	National Biodiversity Authority, Taramani, Chennai	Mr R S Praveen Raj
82	NDA Regarding Solar Light Management Technologies	NDA	Borosil Renewables Limited, Mumbai	Dr Adersh Asok
83	Promote And Develop Cooperation In The Fields Of Wastewater Treatment And Management	Agreement For Research And Capacity Building	Kerala Rural Water Supply Sanitation Agency, Thiruvananthapuram	Dr B Krishnakumar
84	To Strengthen, Promote And Develop Co-Operations In The Field Of Science And Technology AndInterdisciplinary Research Between The Two Institutions	Agreement For Research Collaboration	Vanam India Foundation Ltd, Tamilnadu	Er V V Venugopal & Dr C Kesavachandran
85	To Work In Collaborative Research Projects In The Area Of Aluminium Alloy Based Materials And Process For Moulding, Low Pressure Die Casting Of Aluminium Alloys, Surface Treatment Of Steel Sidewall, Testing Of Bonding Between Steel And Aluminium, Reuse Of Foundry SandAndMaterials Selection	Agreement For Research Collaboration	BRAGA Industries LLP, Tamil Nadu	Dr T P D Rajan

Research Outputs

LIST OF PUBLICATIONS 2023-24

TOTAL PUBLICATIONS: 319

SCI Journals: 228 | Book Chapters: 57

Non-SCI Journals: 34 | Avg. Impact Factor: 5.96

1. Abdi, G., Gryl, M., Sławek, A., Kowalewska, E., Mazur, T., Podborska, A., Mech, K., Zawal, P., Pritam, A., Kmita, A., Alluhaibi, L., Maximenko, A., Vijayakumar, C., & Szaciłowski, K. (2023). Influence of crystal structure and composition on optical and electronic properties of pyridinium-based bismuth iodide complexes. *Dalton Transactions*, *52*(40), 14649–14662. https://doi.org/10.1039/D3DT02910G

2. Abraham, B., Emmanuel, N., Ajikumar, N., Pulassery, S., Varghese, L. E., Murali, V. P., Munnilath, A., Maiti, K. K., & Yoosaf, K. (2023). A Practical Nanoplasmonic SERS Substrate for Differential Diagnosis of Lung Normal and Cancer Cells through Multivariate Statistical Analysis. *ChemNanoMat*, *9*(10), e202300378. https://doi.org/10.1002/cnma.202300378

3. Abraham, B., Syamnath, V. L., Arun, K. B., Fathima Zahra, P. M., Anjusha, P., Kothakotta, A., Chen, Y.-H., Ponnusamy, V. K., & Nisha, P. (2023). Lignin-based nanomaterials for food and pharmaceutical applications: Recent trends and future outlook. *Science of The Total Environment*, *881*, 163316. https://doi.org/10.1016/j.scitotenv.2023.163316

4. Ajay, S. V., Kanthappally, T. M., Sooraj, E. V., & Prathish, K. P. (2023). Dioxin-like POPs emission trends as a decision support tool for developing sustainable MSW management scheme –an exploratory study. *Journal of Environmental Management*, *328*, 117004. https://doi.org/10.1016/j.jenvman.2022.117004

5. Akhil, B. S., Ravi, R. P., Lekshmi, A., Abeesh, P., Guruvayoorappan, C., Radhakrishnan, K. V., & Sujathan, K. (2023). Exploring the Phytochemical Profile and Biological Activities of Clerodendrum infortunatum. *ACS Omega*, *8*(11), 10383–10396. https://doi.org/10.1021/acsomega.2c08080

6. Akhil, M. G., Manoj, V., Suja, P., & Rajan, T. P. D. (2023). Squeeze infiltration processing of lightweight smart aluminum graphite functionally graded composite for enhanced wear resistance. *Journal of Manufacturing Processes*, *104*, 177–188. https://doi.org/10.1016/j.jmapro.2023.09.003

7. Anandan, K., Rajesh, K., Gayathri, K., Mohanbabu, M., & Rao, P. P. (2023). Structural and photocatalytic properties of Nickel Oxide (NIO) and stannic oxide (SNO2) nanoparticles synthesized via solvothermal process. *LARHYSS Journal P-ISSN 1112-3680 / E-ISSN 2521-9782*, *53*, Article 53.

8. Aneesh, E. M., Anoopkumar, A. N., Madhavan, A., Sindhu, R., Binod, P., Kuddus, M., Ruiz, H. A., Pandey, A., Awasthi, M. K., & Show, P. L. (2023). Inferences on bioengineering perspectives and circular economy to tackle the emerging pollutants. *Environmental Technology & Innovation*, *30*, 103116. https://doi.org/10.1016/j.eti.2023.103116

9. Angulakhsmi, N., Ambrose, B., Sathya, S., Kathiresan, M., Lingua, G., Ferrari, S., Gowd, E. B., Wang, W., Shen, C., Elia, G. A., Gerbaldi, C., & Stephan, A. M. (2023). Enhanced Electrochemical Performance of Hybrid Solid Polymer Electrolytes Encompassing Viologen for All-Solid-State Lithium Polymer Batteries. *ACS Materials Au*, *3*(5), 528–539. https://doi.org/10.1021/acsmaterialsau.3c00010

10. Anila, S., & H. Suresh, C. (2023). Nitrogen-doped fullerenes for CO 2 capture: A DFT study. *New Journal of Chemistry*, *47*(6), 3047–3054. https://doi.org/10.1039/D2NJ05761A

11. Anila, S., & Suresh, C. H. (2023). Fulleride-metal η5 sandwich and multi-decker sandwich

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Patent Information (Filed)

CSIR-NIIST Patents (2023-2024)					
Filed In India					
Sl. No.	**NFNO**	**Title**	**Inventors**	**Provsnl. / Comp. Filing Date**	**Application No.**
1	0207NF2022/IN	A bio-based epoxy formulation for coating on metallic surfaces	Rajimol Puthenpurackal Ravi, Rajan Thazhavilai Ponnu Devaraj, Vasu Radhakrishnan Kokkuvayil, Anoop Puthiyamadam, Rajeev Kumar Sukumaran	21-Apr-23	202311034439
2	0094NF2023/IN	A process for preparation of recyclable epoxy vitrimers with a series of crosslinkers and carbon/glass fiber-reinforced composites for engineering applications	Sahoo Sushanta Kumar, Vijayan Arya, Lakshmanan Venkatasubramaniam, Puthenpurackal Ravi Rajimol	26-Jun-23	202311042902
3	0095NF2023/IN	Free flowing sugarcane juice powder and process for production thereof	Venkatesh Thulasiraman, Reshma Mullan Velandy, Nandhulal Anithakumari Mohanlal, Silpa Vellaseri, Anjineyulu Kothakota	25-Aug-23	202311057428
4	0164NF2023/IN	Process for sol-gel coatings of rare-earth (la or ce) phosphates on magnesium alloys	Jithu Jayaraj, Arun Kumar Surendran Nair, Srinivasan Amirthalingam, Raghu Kozhiparambil Gopalan	08-Aug-23	202311053235
5	0179NF2023/IN	Skewed V-groove-based unidirectional planar light concentrators	Asok Adersh, Ramachandran Animesh Mini	06-Nov-23	202311075871
6	0180NF2023/IN	A light-sharing energy system based on functional optical design integrated planar waveguides	Asok Adersh, Singh Manjit, Ramachandran Animesh Mini	06-Dec-23	202311083345

7	0133NF2023/IN	Modularized gas bio-trickling filter device and method for efficient VOC (Volatile Organic Compound) and odour treatment	Partha Kundu	15-Jan-24	202411002844
8	0127NF2023/IN	UAGB-MER Reactor for production of Bio-H2 from liquid waste/wastewater	Kundu Partha, Sivaraman Savithri	23-Jan-24	202411004792
9	0178NF2023/IN	One-pot synthesis of cardanol based resin for superhydrophobic wood coating	Sahoo Sushanta Kumar, John Ben	29-Jan-24	202411005917
10	0126NF2023/IN	Microbial-bio-electrochemical reactor (m-bec) for enhanced bio-H2 production	Kundu Partha	26-Feb-24	202411013914
11	0010NF2024/IN	Hybrid dryer for making plant based leather and pulp based packaging materials	Anjineyulu Kothakota, Harikrishnan Manikyaparambil, Nandhu Lal Anithakumari Mohanlal, Venkatesh Thulasiraman, Venugopalan Velupparambu Madam Vadirajan	07-Mar-24	202411016392

Filed Outside India

Sl. No.	NFNO	Title	Inventors	Comp. Filing Date	Application No.
1	0074NF2020/LK	A system and method for onsite wastewater treatment and resource recovery	Bhaskaran Krishnakumar	14-Jun-23	22729
2	0074NF2020/SY	A system and method for onsite wastewater treatment and resource recovery	Bhaskaran Krishnakumar	14-Jun-23	2023060048
3	0074NF2020/SA	A system and method for onsite wastewater treatment and resource recovery	Bhaskaran Krishnakumar	14-Jun-23	523441196
4	0074NF2020/EG	A system and method for onsite wastewater treatment and resource recovery	Bhaskaran Krishnakumar	14-Jun-23	EG/P/2023/925

5	0074NF2020/ZA	A system and method for onsite wastewater treatment and resource recovery	Bhaskaran Krishnakumar	15-Jun-23	2023/06292
6	0110NF2022/ WO	Hydrophobic and moisture tolerant Bio-resin paper coating with repulpable potential with its preparation process and thereof	Sushanta Kumar Sahoo, Parvathy P A, Ajayaghosh Ayyappanpillai	07-Aug-23	PCT/IN2023/ 050758
7	0021NF2021/CA	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	05-Jan-24	3225101
8	0021NF2021/ZA	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	08-Jan-24	2014/00267
9	0021NF2021/JP	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	01-Feb-24	2024-506671
10	0021NF2021/US	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	01-Feb-24	18/294429
11	0021NF2021/CN	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	04-Feb-24	202380013143

12	0021NF2021/EP	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	05-Feb-24	23737275
13	0145NF2021/CA	Pyrazole amide based compounds and uses against breast cancer thereof	Sulochana Priya, Sasidhar Balappa Somappa, Kozhiparambil Gopalan Raghu, Sreerenjini Lakshmi, Kizhakkan Thiruthi Ashitha	13-Feb-24	3228887
14	0145NF2021/US	Pyrazole amide based compounds and uses against breast cancer thereof	Sulochana Priya, Sasidhar Balappa Somappa, Kozhiparambil Gopalan Raghu, Sreerenjini Lakshmi, Kizhakkan Thiruthi Ashitha	26-Feb-24	18/686652
15	0021NF2021/KR	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	29-Feb-24	10-2024-7006982
16	0145NF2021/EP	Pyrazole amide based compounds and uses against breast cancer thereof	Sulochana Priya, Sasidhar Balappa Somappa, Kozhiparambil Gopalan Raghu, Sreerenjini Lakshmi, Kizhakkan Thiruthi Ashitha	12-Mar-24	22895122.4
17	0145NF2021/CN	Pyrazole amide based compounds and uses against breast cancer thereof	Sulochana Priya, Sasidhar Balappa Somappa, Kozhiparambil Gopalan Raghu, Sreerenjini Lakshmi, Kizhakkan Thiruthi Ashitha	21-Mar-24	0145NF2021
18	0021NF2021/SA	A smart covalent organic framework and a process for carbon dioxide adsorption induced switchable antibacterial activity there from	Ayyappanpillai Ajayaghosh, Mal Arindam, Mishra Kumar Rakesh, Bhaskaran Nair Saraswathy Amma Dileep Kumar, Jacob Jubi, Shankar Pooppanal Sreejith	22-Mar-24	SA 1120241489
19	0082NF2021/IL	An improved disinfection-solidification process for pathogenic medical waste disposal	Sreejith Shankar Pooppanal, Sruthi Surendran Nair, Suja Pottath, Hareesh Unnikrishnan Nair Saraswathy, Rajeev Kumar Sukumaran, Savithri Sivaraman, Parukkuttyamma Devi Sujatha, Ajayaghosh Ayyappanpillai	27-Mar-24	311781

20	0082NF2021/EP	An improved disinfection-solidification process for pathogenic medical waste disposal	Sreejith Shankar Pooppanal, Sruthi Surendran Nair, Suja Pottath, Hareesh Unnikrishnan Nair Saraswathy, Rajeev Kumar Sukumaran, Savithri Sivaraman, Parukkuttyamma Devi Sujatha, Ajayaghosh Ayyappanpillai	28-Mar-24	22878102
21	0145NF2021/JP	Pyrazole amide based compounds and uses against breast cancer thereof	Sulochana Priya, Sasidhar Balappa Somappa, Kozhiparambil Gopalan Raghu, Sreerenjini Lakshmi, Kizhakkan Thiruthi Ashitha	29-Mar-24	---
22	0083NF2021/IL	Disinfection and in situ flocculation-solidification process for pathogenic medical waste disposal	Sreejith Shankar Pooppanal, Sruthi Surendran Nair, Achu Radhakrishnakurup, Visakh Vijayan, Peer Mohamed Abdul Azeez, Hareesh Unnikrishnan Nair Saraswathy, Rajeev Kumar Sukumaran, Savithri Sivaraman, Parukkuttyamma Devi Sujatha, Ajayaghosh Ayyappanpillai	31-Mar-24	311892

Patent Information (Granted)

Granted In India							
Sl. No.	**NFNO**	**Title**	**Inventors**	**Comp. Filing Date**	**Application No.**	**Grant Date**	**Patent No.**
1	0171NF2016/IN	Low cost bio-based ionic liquid crystal membrane useful for energy storage systems & preparation thereof.	Ayyappanpillai Ajayaghosh, Janardhanan Devaki Sudha, Sasi Renjith, Nallathamby Kalaiselvi, Bongu Chandrasekhar	16 Aug-16	201611027797	26 Jun-23	435605
2	0277NF2013/IN	A bioprocess for reducing perchlorate and/or nitrate	Krishnakumar Bhaskaran, Anupama Vijaya Nadaraja	19-Jan-16	201611001839	05-Sep-23	449570
3	0163NF2019/IN	A transparent gel electrolyte system and fast switching electrochromic devices thereof	Deb Biswapriya, Ayyappanpillai Ajayaghosh, Venugopal Ranjana, Prabhu Thulichal Ganesh Prabhu Gayathri, Shankar Pooppanal Sreejith	12-Feb-21	202011006474	26-Oct-23	462505

4	0068NF2018/IN	Thermoelectric materials and the preparation thereof	Deb Biswapriya, Chakkooth Vijayakumar, Ignatious Vijitha, Meshram Manoj Ramakrishna, Singh Jaivinder, Tanjore Puli Yuvaraj	19-Sep-18	201811035273	27-Oct-23	462819
5	0122NF2016/IN	A diketopyrole supramolecular black dye and elastomer as a near infrared filter	Ayyappanpillai Ajayaghosh, Samrat Ghosh	20-Jan-17	201711002216	06-Nov-23	466275
6	0218NF2017/IN	Process for the preparation of pyrylium salts	Sasidhar Balappa Somappa, Chettiyal thodi fathimath salfeena, Ayyappanpillai Ajayaghosh	06-Feb-18	201811004385	07-Nov-23	466604
7	0160NF2018/IN	Improved single vessel process for preparation and purification of alkylphosphocholines and miltefosine thereof	Lankalapalli Ravi Shankar, Thangarasu Arun Kumar, Ayyappanpillai Ajayaghosh	22-Jan-20	201911003844	22-Nov-23	471813
8	0064NF2018/IN	Screening kit for detection of grades of cervical cancer and process for the preparation thereof	Kaustabh Kumar Maiti, Varsha Karunakaran, Kunjuraman Sujathan	22-Jul-19	201811028087	30-Nov-23	475903
9	0219NF2017/IN	Hybrid Planar Light Concentrator with adaptable transparency	Adersh Asok, Ayyappanpillai Ajayaghosh, Animesh M Ramachandran	15-Mar-18	201811008500	15-Dec-23	483372
10	0047NF2019/IN	A process for making weather-resistant and slow-decaying geotextiles	Vadakkethonippuathu Sivankuttynair Prasad, Padinjareveetil Anju, Methalayil Brahmakumar, Das Anitha Ravindranath, Sebastian Sumy	20-Aug-20	201911033776	18-Dec-23	484590
11	0138NF2019/IN	Thermo-responsive molecules for controlled heat and light transmission windows and applications thereof	Ayappanpillai Ajayaghosh, Das Satyajit, Soman Suraj, Asok Adersh, Shankar Pooppanal Sreejith	18-Dec-19	201911052506	27-Dec-23	489513

Granted Outside India

Sl. No	NFNO	Title	Inventors	Comp. Filing Date	Application No.	Grant Date	Patent No.
1	0218NF2017/US	Process for the preparation of pyrylium salts	Sasidhar Balappa Somappa, Chettiyal thodi fathimath salfeena, Ayyappanpillai Ajayaghosh	05-Aug-20	16/967613	30-May-23	11661407

2	0218NF2017/JP	Process for the preparation of pyrylium salts	Sasidhar Balappa Somappa, Chettiyal thodi fathimath salfeena, Ayyappanpillai Ajayaghosh	05-Aug-20	2020-542442	25-Aug-23	7337818
3	0163NF2019/JP	A transparent gel electrolyte system and fast switching electrochromic devices thereof	Deb Biswapriya, Ayyappanpillai Ajayaghosh, Venugopal Ranjana, Prabhu Thulichal Ganesh Prabhu Gayathri, Shankar Pooppanal Sreejith	28-Jan-22	2022-506441	12-Dec-23	7402311
4	0074NF2020/ZA	A system and method for onsite wastewater treatment and resource recovery	Bhaskaran Krishnakumar	15-Jun-23	2023/06292	20-Dec-23	PD044828 ZA-NP
5	0157NF2019/ CN	A thermoresponsive self-assembled organic material as photonic ink and a process of making thereof	Ayyappanpillai Ajayaghosh, Cherumukkil Sandeep, Chakkooth Vijayakumar	02-Mar-23	2021800542145	05-Jan-24	ZL2021800 542145
6	0157NF2019/JP	A thermoresponsive self-assembled organic material as photonic ink and a process of making thereof	Ayyappanpillai Ajayaghosh, Cherumukkil Sandeep, Chakkooth Vijayakumar	17-Jan-23	2023-503223	19-Jan-24	7423855

Technology Transfers (2023-2024)			
Sl. No.	**Title**	**Name of the firm/firms with whom the MoU/Agreement is entered into**	**Project leader**
1	Agreement For Manufacturing Building Bricks Utilizing Waste Foundry Mould Sand Generated By Peekay Steel Ltd.	M/s Peekay Steel Ltd, 4/242, Chinnamadhampalayam, Bilichi Post, Coimbatore - 641019	Dr S Ananthakumar
2	A System And A Method For Onsite Wastewater Treatment And Resource Recovery (NOWA)	Mr. Ahammed Sufiyan O.P, M/s Reebon Solutions, Door No. CP/1/531, Mundote, Malayamma P.O., NIT Campus (via), Calicut – 673 601	Dr B Krishnakumar
3	A Knowhow For Making Coconut Neera Syrup/Sugarcane Juice Syrup	Ms. Dhanya Kiran, D/o Shri Parameshwaran.K Proprietor, Nutriwadi Natural Foods International,Karoor Mundur P.O, Thrissur-680541	Dr M V Reshma
4	A Process For Production Of The Enzyme – Beta Glucosidase Using Filamentous Fungus Employing Solid State Fermentation	M/s Sarthak Metals Limited, SK Chambers, Second Floor, Nelson Square, Chhindwara Road, Nagpur 440013	Dr K Rajeev Sukumaran
5	Agreement For Technology Transfer For Manufacturing Leather Alternative (Vegan Leather) From Sugarcane Bagasse	M/s PA Footwear Pvt. Ltd , Head office MIG 338th Main Road, Phase 1,Nolamber, Mogappair west, Chennai-600037, Tamil Nadu.	Dr Anjineyulu Kothakota
6	Setting Up A Processing Unit Of Agro-Waste (Field Crop Waste Such As Rice And Wheat Waste) And Manufacture Of Single-Use Biodegradable Tableware Including Plates, Bowls, Tumblers, And Spoons	The East Corridor Consultants India PVT LTD, Khasara No. 976, Sarsawa Arjunganj, Lucknow, Uttar Pradesh, India	Dr Anjineyulu Kothakota
7	A System And A Method For Onsite Wastewater Treatment And Resource Recovery (NOWA)	Dr. Sanju Thomas M/S Two degree Climate Control Pvt Ltd 1C, 11/673A, Technocity,KSSIA Building,HMT Estate, Colony, Kanayannur, Ernakulam-683 503	Dr B Krishnakumar
8	Agreement For Technology Transfer For Setting Up Of Plant For Manufacturing Multi-Use Biodegradable Tableware From Seaweed, Chitosan And Carrageenan	M/s Aquagri Processing Pvt Ltd, Plot No--F1, Sipcot, Industrial Complex, Manamadurai -630606.	Dr Anjineyulu Kothakota
9	Agreement For Technology Transfer For Manufacturing Leather Alternative (Vegan Leather) From Seaweed, Chitosan And Carrageenan	M/s Aquagri Processing Pvt Ltd, Plot No-F1, Sipcot, Industrial Complex, Manamadurai -630606.	Dr Anjineyulu Kothakota


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&
Administration

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(Director)

Mr. Raja Shekar K. L.
(Principal Private Secretary)

Dr. Ribin Jones S.B.
(Principal Scientist)

Dr. Deepa Balan
(Senior Scientist)

Dr. Ishita Neogi
(Senior Scientist)

Dr. Vasanth Ragavan K.
(Scientist)

Ms. Arya Senan M. C.
(Technical Assistant)

Mr. Ashik Rasheed
(Staff Car Driver)

The Director, CSIR-NIIST, established the Director's Scientific and Technical Unit (DSTU) to enhance, streamline, and manage the Institute's scientific and administrative functions. The DSTU serves as the central coordinating body for all scientific, administrative file processing, activities, events, and daily operations.

In addition to managing internal operations, the DSTU coordinates visits of high-profile dignitaries, tour programs, and engagements involving the Director, as well as media interactions.

The unit is staffed by a Principal Private Secretary, a Principal Scientist, a Senior Scientist, two Scientists, a Technical Assistant, and a Staff Car Driver. A dedicated workspace for the DSTU was established during the 2023-24 period, providing the team with the resources needed to support their critical functions effectively.

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Mrs. Mercy Joseph, Mr. R.K. Ramesh Kumar, Mr. G. Padmakumar (SO), Mr. S. Antony Peter Raja (AO), Mrs. S. Neethu Induchoodan (SO), Mrs. K. Preetha (SO)

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Sitting (Left to Right)

Mr. V. L. Vishnu, Dr. Somu Roy (F&AO), Mrs. G. Geetha (SO), Mr. Sanjeev Sadanandan

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Mr. B. Ajayakumar, Mr. T. K. Ghosh, Mr. G. Bhakthavalsalam, Mr. Anand Hari, Mr. D. Arul Prakash Mr. T. R. Suresh Kumar

Sitting (Left to Right)

Mr. M. Anil Kumar, Mr. H. C. Raviswamy (SO), Mr. Prasenjeet Mitra (SPO), Mrs. L. Latha, Mrs. Sheeba Saithu

Engineering Services Unit

Standing (Left to Right)

Mr. S. Azhagan, Mr. U. Dharanipathy, Mr. M. Jayadeep, Mr. K. S. Pramod

Sitting (Left to Right)

Dr. C. Shermi, Mr. R. Rajeev (Head), Mr. B. Karthik, Mr. P. Arumugam

FORMER MANAGEMENT COUNCIL

(Till 31st December 2023)

CHAIRMAN

Dr. C. ANANDHARAMAKRISHNAN
Director, CSIR-NIIST

MEMBERS

Dr. K. J. SREERAM
Director, CSIR-CLRI, Chennai

Dr. T. P. D. RAJAN
Senior Principal Scientist

Mr. CHANDRAKANTH C. K.
Senior Principal Scientist, Head RPBD

Dr. M. V. RESHMA
Principal Scientist

Dr. S. S. SREEJAKUMARI
Principal Scientist

Dr. SAURABH SAKHRE
Scientist

Shri. PEER MOHAMMED
Senior Technical Officer (3)

Dr SOMU ROY
Finance and Accounts Officer

MEMBER SECRETARY

Shri. ANTONY PETER RAJA
Administrative Officer, CSIR-NIIST


Events

Events 2023-2024

March 26, 2024: One-Day Biomedical Waste Management Conclave and Stakeholders Meet

March 20-22, 2024: The National Seminar on On-site Grey Water Treatment & Reuse Systems, sponsored by The Department of Drinking Water and Sanitation, Ministry of Jalshakti.

February 27, 2024: Industry Connect Meet on Recent Trends Advances on Fats and Edible Oil Processing

February 15-16, 2024: Two-day capacity-building program for Kerala Rural Water Supply & Sanitation Agency (KRWSA) officers on greywater treatment and management.

February 02, 2024: Industry Connect Meet on Strategic Materials

December 14, 2023: Industry Connect Meeting in areas of Environmental Technologies and Agro-processing Technologies.

December 8, 2023: Fortified Rice Kernels Stakeholders meeting.

November 15, 2023: CSIR-NIIST celebrated Ayurveda Day with an event themed "Ayurveda for Everyone on Everyday"

November 17, 2023: Industry Connect Meet on Novel Building Materials.

November 2023: CSIR pavilion of World Food India 2023 at Pragati Maidan

October 16, 2023: World Food Day 2023 celebration

September 22, 2023: Industry Connect meet on 'Chemical Synergy: Bridging Industries with Synthetic Expertise' at CSIR-NIIST.

August 8, 2023: Industry Connect Meet on Spice Processing: Perspective from a consumer and commercial angle.

July 19, 2023: One-day technical symposium on "Modeling and Simulation in Materials, Minerals and Chemical Processing" organized by CSIR-NIIST.

Industry Connect Meetings

No	Date	Title
1	19-Jun-23	Rubber & Allied Products
2	27-Jun-23	Hotels, Restaurants, Catering Units, Bakeries
3	21-Jul-23	Bioethanol Bio refineries Stakeholders
4	08-Aug-23	Spice Processing: Perspective from a Consumer and Commercial Angle
5	11-Aug-23	Herbal Drugs & Nutraceuticals
6	12-Sep-23	Sustainable Coconut Processing Strategies for the Global Market
7	22-Sep-23	Chemical Synergy: Bridging Industries with Synthetic Expertise
8	17-Nov-23	Novel Building Materials
9	18-Dec-23	Fortified Rice Kernels
10	02-Feb-24	Strategic Materials and Manufacturing Technologies
11	27-Feb-24	Edible Fats & Oils

75वाँ गणतंत्र दिवस समारोह

सीएसआईआर-एनआईआईएसटी में 26 जनवरी, 2024 को आयोजित 75वां गणतंत्र दिवस समारोह एक जीवंत और देशभक्तिपूर्ण कार्यक्रम था ।दिन की शुरुआत निदेशक के नेतृत्व में एक उत्साहपूर्ण ध्वजारोहण समारोह के साथ हुई, जिसमें परिसर में राष्ट्रगान की गूंज के साथ वातावरण में राष्ट्रीय गौरव की गहरी भावना भर गई।निदेशक के भावपूर्ण भाषण ने दिन के ऐतिहासिक महत्व पर प्रकाश डाला और राष्ट्र की प्रगति में सीएसआईआर-एनआईआईएसटी की महत्वपूर्ण भूमिका पर जोर दिया।जैसे-जैसे कार्यक्रम समाप्त हुआ, मिठाइयों के वितरण ने खुशी और एकजुटता का माहौल फैलाया, जो कर्मचारियों, छात्रों, अनुबंध कर्मचारियों और उनके परिवारों के बीच एकता और सौहार्द का प्रतीक था। समारोह की समावेशी प्रकृति ने देशभक्ति और एकजुटता की मजबूत भावना को बढ़ावा दिया, जिसने उपस्थित सभी लोगों पर राष्ट्रीय गौरव की एक स्थायी छाप छोड़ी।

75th Republic Day celebration

The 75th Republic Day celebration at CSIR-NIIST was a grand and patriotic event held on the bright morning of January 26, 2024. The day began with a dignified flag-hoisting ceremony led by the Director near the main entrance, evoking a strong national pride as the National Anthem played. The Director delivered an inspiring speech reflecting the day's historical significance and the nation's achievements, emphasizing CSIR-NIIST's role in national progress. The inclusive invitation extended to staff, students, contract employees, and their families fostered a spirit of unity and patriotism. The event honored Republic Day's importance and created a lasting sense of togetherness and national pride among all attendees.

अंतर्राष्ट्रीय मातृभाषा दिवस समारोह

सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी संस्थान में21 फरवरी, 2024 को सेमिनार हॉल में दोपहर 2:00 बजे अंतर्राष्ट्रीय मातृभाषा दिवस मनाया गया।यह आयोजन भाषाई और सांस्कृतिक विविधता को अपनाने और उसका जश्न मनाने, समुदाय और समावेशिता की मजबूत भावना को बढ़ावा देने के बारे में था।सम्मानित मुख्य वैज्ञानिक डॉ. निशी पी. ने व्यक्तिगत पहचान को आकार देने और हमारी समृद्ध विरासत की रक्षा करने में मातृभाषाओं की महत्वपूर्ण भूमिका को बहुत ही उत्साहपूर्वक रेखांकित किया।श्रीमती नीतू एस. इंदुचूडन ने मुख्य अतिथि डॉ. लक्ष्मी दास का परिचय कराया, जिन्होंने भारत की बहुभाषी विरासत की समृद्धि और विविध भाषाई परिवेश में पले-बढ़े अपने अनुभवों के बारे में बात की।उत्साह को और बढ़ाते हुए, 20 फरवरी को पुस्तक समीक्षा प्रतियोगिता आयोजित की गई, जिसमें प्रतिभागियों का अपनी मातृभाषाओं के प्रति गहरा जुनून देखने को मिला और कार्यक्रम के दौरान पुरस्कार वितरण समारोह का आयोजन किया गया। श्रीमती प्रीता के ने अतिथियों, प्रतिभागियों और समर्पित आयोजन समिति के प्रति उनके अमूल्य योगदान के लिए गहरा आभार व्यक्त करते हुए हार्दिक धन्यवाद प्रस्ताव के साथ कार्यक्रम का समापन किया। समारोह का समापन राष्ट्रगान के भावपूर्ण गायन के साथ हुआ, जो हमारी विविधता में पाई जाने वाली ताकत की मार्मिक याद दिलाता है और भाषाई और सांस्कृतिक समृद्धि को बढ़ावा देने के लिए संस्थान की अटूट प्रतिबद्धता की पुष्टि करता है।

International Mother Language Day Celebration

CSIR-National Institute for Interdisciplinary Science & Technology celebrated International Mother Language Day on February 21, 2024, in the Seminar Hall at 2:00 PM. The event, focused on linguistic and cultural diversity, fostered community and inclusivity. Dr. Nishy P, Chief Scientist, highlighted the role of mother languages in shaping identity and preserving heritage. Mrs. Neethu S.Induchoodan introduced the chief guest, Dr. Lakshmi Das, who spoke about the richness of India's multilingual heritage and her experiences growing up in a diverse linguistic environment. A Book Review Telling Competition held on February 20 showcased participants' passion for their mother languages, with winners receiving prizes at the event. Mrs. Preetha K concluded with a vote of thanks, acknowledging the contributions of guests, participants, and the organizing committee. The celebration ended with the National Anthem, emphasizing unity in diversity and the institute's commitment to promoting linguistic and cultural richness.

अंतर्राष्ट्रीय महिला दिवस

सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान एवं प्रौद्योगिकी संस्थान में 13 मार्च, 2024 को अंतर्राष्ट्रीय महिला दिवस समारोह का आयोजन किया गया। सभागार में आयोजित इस कार्यक्रम की शुरुआत श्रीमती के प्रीता के स्वागत भाषण से हुई, जिसके बाद डॉ. निशी पी. ने अध्यक्षीय भाषण दिया, जिसमें उन्होंने लैंगिक समानता और महिलाओं के सम्मान की आवश्यकता पर जोर दिया। मुख्य अतिथि, केरल विश्वविद्यालय की डॉ. मीना टी. पिल्लई ने "डिजिटल युग में महिलाओं के प्रतिरोध" पर एक सम्मोहक व्याख्यान दिया, जिसमें उन्होंने ऑनलाइन उत्पीड़न को संबोधित किया और समाधान सुझाए। इस कार्यक्रम में 11 मार्च, 2024 को आयोजित भाषण प्रतियोगिता के लिए पुरस्कार वितरण किया गया, जिसमें प्रतिभागियों ने अपने जीवन में प्रभावशाली महिलाओं के बारे में बात की। विजेताओं को सम्मानित किया गया, जिससे इस अवसर का महत्व और बढ़ गया।

International Women's Day

The International Women's Day celebration on March 13, 2024, at CSIR-National Institute for Interdisciplinary Science & Technology in Thiruvananthapuram was a resounding success. Held in the auditorium, the event commenced with a welcome address by Smt. K Preetha, followed by a presidential address from Dr. Nishy P, who emphasized the need for gender equality and respect for women. The chief guest, Dr. Meena T Pillai from the University of Kerala, delivered a compelling talk on "Women's Resistances in the Digital Age," addressing online harassment and offering solutions. The event featured a prize distribution for an elocution competition held on March 11, 2024, where participants spoke about influential women in their lives. Winners were honored, adding to the occasion's significance.

स्वच्छता पखवाड़ा-2023

सीएसआईआर-एनआईआईएसटी में 1 मई से 15 मई, 2023 तक आयोजित स्वच्छता पखवाड़ा-2023, स्वच्छता और पर्यावरण जिम्मेदारी को बढ़ावा देने वाला एक सफल कार्यक्रम था। इसकी शुरुआत 1 मई को निदेशक की "स्वच्छता शपथ" से हुई, जहाँ कर्मचारियों और छात्रों ने स्वच्छता के प्रति प्रतिबद्धता जताई। मुख्य गतिविधियों में 9 मई को परिसर में स्वच्छता अभियान और 10 मई को पाप्पनमकोड जंक्शन के ट्रैफ़िक आइलैंड की सफ़ाई शामिल थी। कार्टून निर्माण और नारा लेखन जैसी विभिन्न प्रतियोगिताओं ने प्रतिभागियों को रचनात्मक रूप से व्यस्त रखा। विशेष पहलों में प्रयोगशालाओं और कार्यालयों को अव्यवस्थित करना, अपशिष्ट पदार्थों का निपटान करना और सौर पैनलों का रखरखाव करना शामिल था। इस कार्यक्रम में लगाए गए पेड़ों के लिए बाड़ लगाना और हरित आवरण को बढ़ाना भी शामिल था। पखवाड़े का समापन उपलब्धियों को सारांशित करने और स्वच्छ भारत सिद्धांतों को सुदृढ़ करने वाले व्याख्यान के साथ हुआ। सक्रिय भागीदारी ने पर्यावरण संरक्षण का एक सराहनीय उदाहरण स्थापित करते हुए स्वच्छ, स्वस्थ और अधिक टिकाऊ पर्यावरण के प्रति सीएसआईआर-एनआईआईएसटी के समर्पण को उजागर किया।

Swachhta Pakhwada-2023

The Swachhta Pakhwada-2023 at CSIR-NIIST, held from May 1 to May 15, 2023, was a successful event promoting cleanliness and environmental responsibility. It began with the Director's "Swachhta Pledge" on May 1, where staff and students committed to cleanliness. Key activities included a campus-wide cleanliness drive on May 9, and a cleanup of Pappanamcode Junction's Traffic Island on May 10. Various competitions, such as cartoon creation and slogan writing, engaged participants creatively. Special initiatives involved decluttering laboratories and offices, disposing waste materials, and maintaining solar panels. The event also included fencing for planted trees and enhancing green cover. The fortnight concluded with a lecture summarizing the achievements and reinforcing the Swachh Bharat principles. The active participation highlighted

CSIR-NIIST's dedication to a cleaner, healthier, and more sustainable environment, setting a commendable example of environmental stewardship.

राष्ट्रीय प्रौद्योगिकी दिवस समारोह

संस्थान में 11 मई, 2023 को राष्ट्रीय प्रौद्योगिकी दिवस 2023 मनाया गया। निदेशक,सीएसआईआर-एनआईआईएसटी, डॉ. सी. आनंदरामकृष्णन की अध्यक्षता में आयोजित समारोह में प्रिज्म जॉनसन लिमिटेड, मुंबई के उपाध्यक्ष-संचालन डॉ. सुदीप्ता साहा और मैकगिल विश्वविद्यालय, कनाडा के खाद्य विज्ञान विभाग के प्रो. होसाहल्ली एस. रामास्वामी ने राष्ट्रीय प्रौद्योगिकी दिवस पर व्याख्यान दिया। सेंट टेरेसा कॉलेज, एर्नाकुलम के एम.एससी. रसायन विज्ञान के छात्रों ने विभिन्न सुविधाओं का दौरा किया और एनएमआर, एक्सआरडी, एसईएम, टीईएम आदि जैसे परिष्कृत उपकरणों की कार्यप्रणाली का प्रदर्शन किया।

National Technology Day Celebration

The National Technology Day 2023 was celebrated in the Institute on May 11, 2023. In a function presided over by Dr C Anandharamakrishnan, Director, CSIR-NIIST, Dr. Sudipta Saha, Vice President- Operations, Prism Johnson Ltd, Mumbai, and Prof. Hosahalli S. Ramaswamy, Department of Food Science, McGill University, Canada, delivered the National Technology Day Lectures. M. Sc. Chemistry students from St. Teresa's College, Ernakulum, visited the various facilities such as NMR, XRD, SEM, TEM, etc.

विश्व पर्यावरण दिवस समारोह

सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान एवं प्रौद्योगिकी संस्थान (सीएसआईआर-एनआईआईएसटी) ने 5 जून, 2023 को पर्यावरण जागरूकता और कार्रवाई गतिविधियों के साथ विश्व पर्यावरण दिवस मनाया। मुख्य कार्यक्रम सीएसटीडी सेमिनार हॉल में पूर्वाह्न 11:00 बजे आयोजित पर्यावरण दिवस प्रतिज्ञा (लाइफ प्रतिज्ञा) समारोह था, जहाँ कर्मचारी और छात्र कार्बन फुटप्रिंट को कम करने वाली संधारणीय जीवन शैली के लिए प्रतिबद्ध होने के लिए एकजुट हुए। प्रतिभागियों को व्यक्तिगत रूप से और पोर्टल (https://e-hrms.gov.in) के माध्यम से ऑनलाइन प्रतिज्ञा लेने के लिए प्रोत्साहित किया गया। समारोह में दैनिक प्रथाओं और अनुसंधान में संधारणीयता को एकीकृत करने के महत्व पर प्रकाश डाला गया। ऐसी पहलों को बढ़ावा देकर, सीएसआईआर-एनआईआईएसटी ने पर्यावरण संरक्षण में अपनी भूमिका को मजबूत किया और भविष्य की पीढ़ियों के लिए ग्रह को संरक्षित करने की दिशा में जिम्मेदारी की संस्कृति को प्रेरित किया।

World Environment Day Celebrations

CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) celebrated World Environment Day on June 5, 2023, with impactful environmental awareness and action activities. The central event was the Environment Day Pledge (LIFE pledge) ceremony held at 11:00 AM in the CSTD Seminar Hall, where staff and students united to commit to sustainable lifestyles that reduce carbon footprints. Participants were encouraged to take the pledge in person and online via the portal (https://e-hrms.gov.in), extending the reach of their commitment. The celebration highlighted the importance of integrating sustainability into daily practices and research. By promoting such initiatives, CSIR-NIIST reinforced its role in environmental stewardship and inspired a culture of responsibility toward preserving the planet for future generations.

विश्व रक्तदाता दिवस समारोह

विश्व रक्तदाता दिवस, 14 जून, 2023 को, सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान एवं प्रौद्योगिकी संस्थान (सीएसआईआर-एनआईआईएसटी) ने इस अवसर को उत्साहपूर्वक और प्रतिबद्धतापूर्वक मनाया। निदेशक ने संस्थान के सेमिनार हॉल में पूर्वाह्न 11:00 बजे शपथ समारोह का नेतृत्व किया, जिसमें रक्तदान की महत्वपूर्ण भूमिका पर जोर दिया गया। सभी कर्मचारियों और छात्रों द्वारा भाग लिया गया, यह कार्यक्रम कार्रवाई के लिए शक्तिशाली आह्वान था, जिसमें प्रतिभागियों ने रक्तदान अभियान में सक्रिय रूप से शामिल होने की शपथ ली। समारोह ने वैज्ञानिक अनुसंधान से परे सामाजिक कल्याण के लिए सीएसआईआर-एनआईआईएसटी के समर्पण को रेखांकित किया। समारोह में नियमित रक्तदान की महत्वपूर्ण आवश्यकता पर प्रकाश डाला गया। इस कार्यक्रम ने समुदाय और जिम्मेदारी की एक मजबूत भावना को बढ़ावा दिया, इस बात को पुष्ट किया कि सामूहिक कार्रवाई से जीवन को महत्वपूर्ण रूप से बचाया जा सकता है और स्वास्थ्य में सुधार हो सकता है।

World Blood Donor Day Celebrations

On World Blood Donor Day, June 14, 2023, the CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) observed the occasion enthusiastically and committed. The Director led a Pledge Ceremony at 11:00 AM in the Institute Seminar Hall, emphasizing the vital role of blood donation. Attended by all staff and students, the event was a powerful call to action, with participants pledging to engage in blood donation drives actively. The ceremony

underscored CSIR-NIIST's dedication to societal well-being beyond scientific research. The celebrations highlighted the critical need for regular blood donations. It fostered a strong sense of community and responsibility, reinforcing that collective action can significantly save lives and improve health.

भारतीय अंगदान दिवस

भारतीय अंगदान दिवस, 3 अगस्त, 2023 को, निदेशक,सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान एवं प्रौद्योगिकी संस्थान (सीएसआईआर-एनआईआईएसटी) के नेतृत्व में संस्थान सेमिनार हॉल में पूर्वाह्न11 बजे एक महत्वपूर्ण प्रतिज्ञा समारोह आयोजित कियागया। इस कार्यक्रम का उद्देश्य जागरूकता बढ़ाना और अंगदान को प्रोत्साहित करना था, जिसमें कर्मचारियों और छात्रों की मजबूत भागीदारी रही। निदेशक के भावपूर्ण संबोधन ने जीवन बचाने और चिकित्सा विज्ञान को आगे बढ़ाने में अंगदान की महत्वपूर्ण भूमिका पर प्रकाश डाला। समारोह ने अंगदान के महत्व को पुष्ट करते हुए प्रतिज्ञा का अवसर और एक शैक्षिक मंच दोनों प्रदान किया। सीएसआईआर-एनआईआईएसटीसमुदाय ने भाग लेकर सामाजिक कल्याण और परोपकार के प्रति अपनी प्रतिबद्धता का प्रदर्शन किया। यह आयोजन सीएसआईआर-एनआईआईएसटीके स्वास्थ्य पहलों को बढ़ावा देने और दान की संस्कृति को बढ़ावा देने के चल रहे प्रयासों को दर्शाता है, जो एक अधिक महत्वपूर्ण कारण के लिए गंभीरता और सामूहिक समर्पण का दिन रहा।

Indian Organ Donation Day

On Indian Organ Donation Day, August 3, 2023, CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) hosted a significant pledge ceremony at 11 am in the Institute Seminar Hall, led by the Director. The event aimed to raise awareness and encourage organ donation, with strong participation from staff and students. The Director's heartfelt address highlighted the critical role of organ donation in saving lives and advancing medical science. The ceremony provided both a pledge opportunity and an educational platform, reinforcing the importance of organ donation. The CSIR-NIIST community demonstrated its commitment to societal welfare and altruism by participating. This observance reflects CSIR-NIIST's ongoing efforts to promote health initiatives and foster a culture of giving, marking a day of solemnity and collective dedication to a more significant cause.

हिंदी पखवाड़ा समारोह

राष्ट्रीय अंतर्विषयी विज्ञान एवं प्रौद्योगिकी संस्थान ने 18 से 29 सितंबर, 2023 तक हिंदी पखवाड़ा मनाया, जिसमें हिंदी के प्रचार-प्रसार के प्रति अपनी प्रतिबद्धता को सप्ताह भर चलने वाले सामान्य आयोजन से कहीं आगे बढ़ाया। इस दौरान कर्मचारियों, शोधार्थियों, परियोजना कर्मचारियों और उनके बच्चों को शामिल करने के उद्देश्य से कई प्रतियोगिताएं आयोजित की गईं, जिनमें निबंध लेखन, टिप्पण लेखन और अनुवाद, प्रश्नोत्तरी, गायन और प्रस्तुतियां शामिल थीं, जो सभी हिंदी पर केंद्रित थीं। उल्लेखनीय कार्यक्रमों में 18 सितंबर को डॉ. हर्षा बजाज के नेतृत्व में चित्र व्याख्या प्रतियोगिता, 19 सितंबर को श्री जेडी जोस द्वारा समन्वित बच्चों के लिए प्रश्नोत्तरी और 21 सितंबर को डॉ. श्रीजाकुमारी एस.एस. के नेतृत्व में अंताक्षरी शामिल थी। पखवाड़े में 25 सितंबर को हिंदी पेपर प्रस्तुति और 28 सितंबर को एकल गीत प्रतियोगिता जैसी विशेष प्रतियोगिताएं भी हुईं, जिसमें श्री जेडी जोस ने सहयोग किया। यह पहल 29 सितंबर को समापन समारोह के साथ संपन्न हुई, जहां निदेशक डॉ. सी. आनंदरामकृष्णन ने कार्यालय के काम में हिंदी के महत्व पर प्रकाश डाला। पुरस्कार वितरित किए गए, और डॉ. बिनोद परमेश्वरन और डॉ. सुब्रता दास ने भाषणों में भारत के विकास में हिंदी की भूमिका पर जोर दिया। अपने संगठन और सार्थक विषय-वस्तु के लिए प्रशंसित इस कार्यक्रम का समापन कर्मचारियों की ओर से हिंदी के अधिक से अधिक उपयोग के प्रति प्रतिबद्धता के साथ हुआ, जिसने भाषा के प्रचार-प्रसार के लिए संस्थान के समर्पण को रेखांकित किया।

Hindi Fortnight Celebration

The National Institute for Interdisciplinary Science and Technology celebrated its first Hindi Fortnight from September 18 to 29, 2023, elevating its commitment to Hindi promotion beyond the usual week-long observance. This period featured an array of competitions aimed at engaging staff, research scholars, project staff, and their children, including essay writing, noting and translation, quizzes, singing, and presentations, all centered around Hindi. Notable events included a picture interpretation competition led by Dr. Harsha Bajaj on September 18, a children's quiz coordinated by Shri. Jedi Jose on September 19, and an antakshari on September 21 emphasizing cognitive abilities under Dr. Sreejakumari S.S. The fortnight also saw specialized competitions like a Hindi paper presentation on September 25 and a solo song contest on September 28, with Shri. Jedi Jose facilitating the latter. The initiative concluded on September 29 with a closing ceremony, where Director Dr. C. Anandharamakrishnan highlighted the importance of Hindi in office work. Prizes were distributed, and speeches by Dr. Binod Parameswaran and Dr. Subrata Das emphasized the role of Hindi in India's development. The event, praised for its organization and meaningful content, ended on a high note with a commitment from the staff towards more significant Hindi usage, underscoring the Institute's dedication to the language's promotion.

सीएसआईआर स्थापना दिवस

सीएसआईआर-एनआईआईएसटी, तिरुवनंतपुरम ने 26 सितंबर, 2023 को सीएसआईआर स्थापना दिवस के संबंध में भ्रमण दिवस आयोजित किया। कार्यक्रम की शुरुआत वैज्ञानिक-छात्र संपर्क कार्यक्रम से हुई। डॉ. निशी (बीडीडी के प्रमुख और कार्यवाहक निदेशक), डॉ. यू.एस. हरीश, एचआरएडी के प्रमुख और डॉ. जोशी जोसफ (प्रधान वैज्ञानिक और जिज्ञासा समन्वयक) ने छात्र सभा को संबोधित किया। इसके बाद छह विभागों की विभिन्न विश्लेषणात्मक सुविधाओं, प्रदर्शनियों और प्रयोगशालाओं का संस्थागत दौरा किया गया: रासायनिक विज्ञान तथा प्रौद्योगिकी प्रभाग (सीएसटीडी), सामग्री विज्ञान तथा प्रौद्योगिकी प्रभाग (एमएसटीडी), माइक्रोबियल प्रसंस्करण तथा प्रौद्योगिकी प्रभाग (एमपीटीडी), कृषि प्रसंस्करण तथा प्रौद्योगिकी प्रभाग (एपीटीडी), पर्यावरण प्रौद्योगिकी प्रभाग (ईटीडी) और सतत ऊर्जा केंद्र (सी-एसईटी)। स्थापना दिवस कार्यक्रमों में 7 संस्थानों के 639 छात्रों और संकायों ने भाग लिया।

CSIR Foundation Day

CSIR-NIIST, Thiruvananthapuram, conducted an open day in connection with the CSIR Foundation Day on September 26, 2023. The event started with the Scientist-Student Connect program. Dr. Nishy (Head of BDD, and Officiating Director), Dr. U. S. Hareesh, Head of HRAD & Dr. Joshy Joseph (Principal Scientist & JIGYASA Coordinator) addressed the student gathering. This was followed by an institutional visit to various Analytical facilities, Exhibits, and Laboratories of the six departments: Chemical Sciences and Technology Division (CSTD), Materials Science and Technology Division (MSTD), Microbial Processes and Technology Division (MPTD), Agro Processing and Technology Division (APTD), Environmental Technology Division (ETD) and Centre for Sustainable Energy (C-SET). 639 Students and faculties from 7 institutions participated in the foundation day programs.

एनआईआईएसटी स्थापना दिवस

6 अक्टूबर, 2023 को सीएसआईआर-एनआईआईएसटी ने फूड आर्किटेक्चर लैब के उद्घाटन के साथ सीएसआईआर और सीएसआईआर-एनआईआईएसटी स्थापना दिवस मनाया। मुख्य अतिथि पद्म भूषण डॉ. कृष्ण एम. एला (अध्यक्ष, अनुसंधान परिषद सीएसआईआर-एनआईआईएसटी और कार्यकारी अध्यक्ष, भारत बायोटेक इंटरनेशनल लिमिटेड, हैदराबाद) ने स्थापना दिवस व्याख्यान दिया। आईआरईएल के अध्यक्ष और प्रबंध निदेशक दीपेंद्र सिंह मुख्य अतिथि थे। सीएसआईआर-एनआईआईएसटी के निदेशक डॉ. सी आनंदरामकृष्णन ने समारोह की अध्यक्षता की।

NIIST Foundation Day

On October 6, 2023, CSIR-NIIST celebrated CSIR and CSIR-NIIST Foundation Day with the inauguration of the Food Architecture Lab. The Chief Guest Padma Bhushan, Dr. Krishna M. Ella (Chairman, Research Council CSIR-NIIST and Executive Chairman, Bharat Biotech International Limited, Hyderabad) gave the foundation day lecture. Deependra Singh, Chairman and Managing Director of IREL, was the Guest of Honour. Dr C Anandharamakrishnan, Director of CSIR-NIIST, presided over the function.

फिट इंडिया स्वच्छता फ्रीडम रन 4.0

28 अक्टूबर, 2023 को, सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी संस्थान (सीएसआईआर-एनआईआईएसटी) ने भारत सरकार के फिट इंडिया मूवमेंट के साथ तालमेल बिठाते हुए 'फिट इंडिया स्वच्छता फ्रीडम रन' 4.0 की मेजबानी की। यह समावेशी कार्यक्रम, जो कर्मचारियों, शोधार्थियों, परियोजना कर्मचारियों, अनुबंध कर्मचारियों और उनके परिवारों के लिए खुला है, सीएसआईआर-एनआईआईएसटी मुख्य भवन से पूर्वाह्न 7:30 बजे शुरू हुआ। प्रतिभागियों ने पाप्पनमकोड जंक्शन, कारक्कमंडपम, हाई स्कूल रोड को कवर करते हुए 3 किमी का मार्ग तय किया और वापस एनआईआईएसटी पहुंचे। इस कोर्स को चुनौतीपूर्ण और सुरक्षित दोनों तरह से डिजाइन किया गया था। पहले दौड़कर आने वाले, पाँच पुरुष और पाँच महिलाओं को उनके प्रदर्शन के लिए सम्मानित और पुरस्कृत किया गया। इस दौड़ ने समुदाय की फिटनेस, स्वच्छता और स्वतंत्रता के प्रति प्रतिबद्धता को उजागर किया, जो फिट इंडिया मूवमेंट के मूल मूल्यों को दर्शाता है।

Fit India Swachhata Freedom Run 4.0

On October 28, 2023, the CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) hosted the 'Fit India Swachhata Freedom Run' 4.0, in alignment with the Government of India's Fit India Movement. The inclusive event, open to staff, research scholars, project staff, contract staff, and their families, began at 7:30 AM from the CSIR-NIIST Main Building. Participants ran a 3km route covering Pappanamcode Junction, Karakkamandapam, High School Road, and returning to NIIST. The course was designed to be both challenging and safe. The first ten finishers, five male and five female, were recognized and rewarded for their performance. The run highlighted the community's commitment to fitness, cleanliness, and freedom, embodying the core values of the Fit India Movement.

सतर्कता जागरूकता सप्ताह

सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी संस्थान (एनआईआईएसटी), तिरुवनंतपुरम ने सरदार वल्लभभाई पटेल के जन्मदिन 31 अक्टूबर के अवसर पर 30 अक्टूबर से 3 नवंबर, 2023 तक सतर्कता जागरूकता सप्ताह मनाया। इस सप्ताह की थीम थी, "भ्रष्टाचार को न कहें; राष्ट्र के प्रति प्रतिबद्ध हों," इस सप्ताह भ्रष्टाचार मुक्त वातावरण को बढ़ावा देने पर जोर दिया गया। गतिविधियों में लिखित प्रश्नोत्तरी, निबंध लेखन, पोस्टर, नारा बनाना और वीडियो या जिंगल प्रतियोगिताएं शामिल थीं, जिन्हें सतर्कता और भ्रष्टाचार पर संवाद को प्रोत्साहित करने के लिए बनाया गया था। सरकारी गर्ल्स हायर सेकेंडरी स्कूल, मलयेनकीझू में वाद-विवाद प्रतियोगिता का उद्देश्य छात्रों में ईमानदारी के मूल्यों को स्थापित करना था। संस्थान और पाप्पनमकोड जंक्शन पर बैनरों ने इस संदेश को व्यापक रूप से प्रचारित किया। सप्ताह का समापन कर्मचारी के शपथ के साथ हुआ, जिसमें नैतिक मानकों के प्रति उनकी प्रतिबद्धता की पुष्टि की गई। इस आयोजन ने ईमानदारी और पारदर्शिता को सफलतापूर्वक बढ़ावा दिया, भ्रष्टाचार के खिलाफ लड़ाई में योगदान दिया और लोकतांत्रिक मूल्यों को मजबूत किया।

Vigilance Awareness Week

CSIR-National Institute for Interdisciplinary Science & Technology (NIIST) in Thiruvananthapuram observed Vigilance Awareness Week from October 30 to November 3, 2023, aligning with SardarVallabhbhai Patel's birthday on October 31. The theme, "Say no to corruption; commit to the Nation," emphasized fostering a corruption-free environment. Activities included a Written Quiz, Essay Writing, Poster, Slogan Making, and Videos or Jingles competitions, designed to encourage dialogue on vigilance and corruption. A debate competition at Govt. Girls Higher Sec. School, Malayenkeezhu, aimed to instill values of integrity among students. Banners at the institute and Pappanamcode Junction promoted the message widely. The week concluded with an integrity pledge by the staff, reaffirming their commitment to ethical standards. The observance successfully promoted integrity and transparency, contributing to the fight against corruption and reinforcing democratic values.

राष्ट्रीय एकता दिवस

31 अक्टूबर, 2023 को सीएसआईआर-राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी संस्थान (एनआईआईएसटी), तिरुवनंतपुरम ने सरदार वल्लभभाई पटेल की जयंती के अवसर पर राष्ट्रीय एकता दिवस मनाया। इस अवसर पर सेमिनार हॉल में पूर्वाह्न 11 बजे शपथ ग्रहण समारोह आयोजित किया गया। राष्ट्रीय एकता और अखंडता को बढ़ावा देने के लिए समर्पित इस कार्यक्रम में कर्मचारियों और छात्रों ने सक्रिय भागीदारी की। समारोह में राष्ट्र को एकजुट करने और एकता, अखंडता और सुरक्षा के मूल्यों को मजबूत करने की पटेल की विरासत को श्रद्धांजलि दी गई। यह आयोजन इन मूलभूत आदर्शों के प्रति हमारी सामूहिक प्रतिबद्धता की सार्थक पुष्टि थी।

Rashtriya Ekta Diwas

On October 31, 2023, CSIR-National Institute for Interdisciplinary Science & Technology (NIIST) commemorated Rashtriya Ekta Diwas, marking the birth anniversary of Sardar Vallabhbhai Patel, with a solemn pledge-taking ceremony at 11:00 AM in the Seminar Hall. The event, dedicated to promoting national unity and integrity, saw active participation from staff and students. The ceremony paid tribute to Patel's legacy of uniting the nation and reinforcing the values of unity, integrity, and security. This observance was a meaningful reaffirmation of our collective commitment to these foundational ideals.

संविधान दिवस

24 नवंबर, 2023 को, सीएसआईआर-एनआईआईएसटीने 26 नवंबर को बंद अवकाश होने के कारण तिथि से पहले "संविधान दिवस" मनाया। संस्थान के सभागार में सुबह 11:00 बजे आयोजित इस कार्यक्रम में संविधान की प्रस्तावना पढ़ी गई। इस पाठ ने संविधान में निहित लोकतांत्रिक मूल्यों, अधिकारों और जिम्मेदारियों के प्रति संस्थान की प्रतिबद्धता को रेखांकित किया। कर्मचारियों की सभा ने व्यक्तिगत और पेशेवर रूप से इन आदर्शों को बनाए रखने की सामूहिक प्रतिज्ञा पर प्रकाश डाला। यह उत्सव संविधान का सम्मान करने और राष्ट्रीय एकता और संवैधानिक जागरूकता को बढ़ावा देने के लिए सीएसआईआर-एनआईआईएसटी के समर्पण को दर्शाता है। इस कार्यक्रम ने संस्थागत और व्यक्तिगत मूल्यों को निर्देशित करने में संविधान के महत्व की याद दिलाई।

Constitution Day

On November 24, 2023, CSIR-NIIST celebrated "Constitution Day" before the official date due to a closed holiday on November 26. Held at 11:00 AM in the institute's Auditorium, the event was marked by reading the Constitution's Preamble. This recitation underscored the institute's commitment to the democratic values, rights, and responsibilities enshrined in the Constitution. Staff gathering highlighted a collective pledge to uphold these ideals personally and professionally. The celebration reflected CSIR-NIIST's dedication to honoring the Constitution and fostering

national unity and constitutional awareness. It served as a reminder of the Constitution's importance in guiding institutional and individual values.

विश्व हिंदी दिवस समारोह

10 जनवरी, 2024 को सीएसआईआर- राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी संस्थान (एनआईआईएसटी), तिरुवनंतपुरम ने अपनी राजभाषा कार्यान्वयन समिति द्वारा आयोजित कार्यक्रम के माध्यम से उत्साहपूर्वक विश्व हिंदी दिवस मनाया। इस कार्यक्रम का उद्देश्य हिंदी के उपयोग को बढ़ावा देना और भारत की समृद्ध भाषाई विरासत का सम्मान करना था। डॉ. सी. आनंदरामकृष्णन, निदेशक, सीएसआईआर-एनआईआईएसटी, मुख्य अतिथि डॉ. टी.बी. प्रदीप कुमार,प्रभारी अधिकारी,बीच सैंड एंड ऑफशोर एक्सप्लोरेशन एसोसिएशन ने इस अवसर पर अपनी उपस्थिति दर्ज कराई। डॉ. सोमू रॉय ने कार्यक्रम का उद्घाटन किया और सरकारी कार्यालयों में हिंदी के महत्व पर जोर दिया। इस वर्ष की थीम, "पारंपरिक ज्ञान से कृत्रिम बुद्धिमत्ता तक हिंदी" का परिचय प्रशासनिक अधिकारी श्री आंटणी पीटर राजा एस ने दिया, जिसमें पारंपरिक और आधुनिक संदर्भों में हिंदी की प्रासंगिकता को रेखांकित किया गया।

अपने संबोधन के दौरान, डॉ. प्रदीप कुमार ने हिंदी की सरलता की प्रशंसा की और इसके संवैधानिक महत्व पर प्रकाश डाला। इस समारोह में डॉ. जयमूर्ति द्वारा संचालित 'मेक ए रील' और 'अंताक्षरी' जैसी सांस्कृतिक और भाषाई प्रतियोगिताएँ शामिल थीं। पिछले हिंदी शब्दावली प्रतियोगिताओं के विजेताओं और प्रबोध, प्रवीण, प्राज्ञ और पारंगत जैसी हिंदी दक्षता परीक्षाओं के विजेताओं को प्रमाण पत्र और नकद पुरस्कार से सम्मानित किया गया। पूरे संस्थान में प्रसिद्ध हिंदी उद्धरण प्रमुखता से प्रदर्शित किए गए, जिससे दिन का सांस्कृतिक महत्व बढ़ गया।

World Hindi Day Celebrations

On January 10, 2024, the CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), Thiruvananthapuram, enthusiastically celebrated World Hindi Day through an event organized by its Official Language Implementation Committee. The event aimed to promote using Hindi in official settings and honor India's rich linguistic heritage. Dr. C Anandharamakrishnan, CSIR-NIIST Director, Chief Guest Dr. T.B. Pradeep Kumar, Officer-in-Charge of the Beach Sand and Offshore Exploration Association, graced the occasion. Dr. Somu Roy inaugurated the event and emphasized the significance of Hindi in government offices. This year's theme, "Hindi from Traditional Knowledge to Artificial Intelligence," was introduced by Administrative Officer Mr. Antony Peter Raja S, underscoring Hindi's relevance in traditional and modern contexts.

During his address, Dr. Pradeep Kumar praised the simplicity of Hindi and highlighted its constitutional importance. The celebration included cultural and linguistic competitions such as 'Make a Reel' and 'Antakshari,' conducted by Dr. Jayamurthy. Winners of previous Hindi vocabulary contests and achievers of Hindi proficiency exams, such as Prabodh, Praveen, Pragya, and Parangat, were honored with certificates and cash prizes. Famous Hindi quotes were prominently displayed throughout the institute, enhancing the cultural significance of the day.

राष्ट्रीय विज्ञान दिवस समारोह

सीएसआईआर-एनआईआईएसटी में राष्ट्रीय विज्ञान दिवस समारोह 28 फरवरी 2024 को आयोजित किया गया। तमिलनाडु केंद्रीय विश्वविद्यालय के स्कूल ऑफ लाइफ साइंसेज के प्रोफेसर और डीन तथा सीएसआईआर-सीएफटीआरआई, मैसूर के पूर्व निदेशक प्रोफेसर राम राजशेखरन ने राष्ट्रीय विज्ञान दिवस पर व्याख्यान दिया। वैज्ञानिक-छात्र संवाद कार्यक्रम, अनुसंधान एवं विकास सुविधाओं का दौरा तथा इंटरैक्टिव मजेदार क्विज स्टेशनों की व्यवस्था की गई। विभिन्न शैक्षणिक संस्थानों के लगभग 680 छात्रों ने सीएसआईआर-एनआईआईएसटी के विभिन्न प्रभागों का दौरा किया।

National Science Day Celebrations

The National Science Day Celebrations at CSIR-NIIST was organized on February 28, 2024. Prof Ram Rajasekharan, Professor and Dean, School of Life Sciences, Central University of Tamil Nadu and former Director, CSIR-CFTRI, Mysore, delivered the National Science Day Lecture. A scientist-student interaction program, a visit to R&D facilities, and interactive fun quiz stations were arranged. Around 680 students from various educational institutions visited the various divisions of CSIR-NIIST.

General Information

RECRUITED

TECHNICAL ASSISTANTS


Mr. ATHUL K.


Ms. ANILA G. K.


Mr. AZHAGAN S.


Dr. VENKANNA G.

JUNIOR SECRETARIAT ASSISTANTS


Mr. SAMBHU NAMBOOTHIRI


Mrs. ARYA SASIDHARAN


Mr. NITHIN C.


Mr. VISHNU M. J.


Mr. ANAND HARI


Mrs. GEETHU S.

JUNIOR STENOGRAPHERS


Ms. DEVIKA S


Ms. CHANDRA A.


Mr. ARUL PRAKASH D.

STAFF CAR DRIVER

Mr. ASHIK RASHEED

RESIDENT MEDICAL OFFICER

Dr. ANSU A. SURESH

JOINED ON TRANSFER

Mrs. ANIJA T. S.
Technician (1)

Mr. PRASANJEET MITRA
Stores & Purchase Officer

Dr. ARUN KUMAR V.
Sr. Scientist

Dr. RAMESH K. V.
Chief Scientist

RETIREMENTS

Dr. P. SUJATHA DEVI
Chief Scientist

Dr. S. SAVITHRI
Chief Scientist

Mrs. KOMALA SOMAN
Asst. Section Officer

Mrs. M. GEETHA
Lab Assistant

Mr. P. N. SIVANKUTTY NAIR
Sr. Technician (2)

Mr. K. UNNIKRISHNAN
Lab Assistant

PROMOTIONS

Dr. MADHAVAN NAMPOOTHIRI K.
Chief Scientist

Er. VENUGOPAL V. V.
Chief Scientist

Dr. KESAVACHANDRAN C.
Chief Scientist

Mr. PRAVEEN RAJ R. S.
Sr. Principal Scientist

Mr. PUSHKIN S.
Sr. Technical Officer (2)

Mr. KIRAN MOHAN
Sr. Technical Officer (2)

Mr. KIRAN J. S.
Sr. Technical Officer (1)

Mr. AJIT PRABHAKARAN
Sr. Technical Officer (2)

Mrs. GEETHA G.
Section Officer (F&A)

Mr. JAYADEEP M.
Sr. Technician (2)

Mr. PRAVEEN KANNAL
Sr. Technician (2)

Mr. SASIKUMAR O.V.
Private Secretary

TRANSFER ON PROMOTION

Mr. K. P. KRISHNAN
as Section Officer(Gen)
to CSIR-CECRI, Karaikudi

OTHER TRANSFERS

Mr. K. SURESH KANNAN
to CSIR-CECRI,Karaikudi

Dr. B. V. THIRUMALESH
to CSIR- CFTRI, Mysuru

DEPUTATION

1. Dr. P. Binod, Principal Scientist visited the Federal University of Parana, Brazil as a visiting Professor from 30.03.2023 to 30.04.2023.

2. Dr. C. Anandharamakrishnan, Director visited Indonesia from 03.04.2023 to 05.04.2023 to attend a Review Committee Meeting of the International Coconut Community" hosted by Coconut Community, Bali, Indonesia.

3. Dr. N. Ramesh Kumar, Principal Scientist visited Germany from 27.03.2023 to 27.06.2023 to avail Raman Research Fellowship for the year 2022-23.

4. Dr. C. Vijayakumar, Principal Scientist visited Solar Energy Research Institute, Malaysia from 22.05.2023 to 30.05.2023.

5. Dr. S. Ananthakumar, Chief Scientist visited Dhaka, Bangladesh to participate in CSIR-BCSIR Joint Symposium from 30.05.2023 to 31.05.2023.

6. Dr. P. Binod, Principal Scientist visited Northwest A& F University, Yangling, China from 28.07.2023 to 31.07.2023 to participate and deliver an invited talk at the International Conference on Sustainable Solid Waste Treatment and Management 2023.

7. Dr. C. Vijayakumar, Principal Scientist visited Mahidol University, Bangkok, Thailand from 28.07.2023 to 10.08.2023.

8. Dr. Anjineyulu Kothakota, Scientist visited Eastern Cape, South Africa from 31.07.2023 to 03.08.2023 to participate in the BRICS Young Scientist Forum and Innovator Prize Competition.

9. Dr. P. Nisha, Principal Scientist visited Manila, Philippines from 04.09.2023 to 09.09.2023 to attend and deliver an oral presentation at the 20th APCChE congress 84th PIChE National Convention.

10. Dr. Jubi John, Senior Scientist visited the Technical University of Braunschweig, Germany from 01.11.2023 to 31.01.2024.

11. Dr. E. BhojeGowd, Sr. Principal Scientist visited Saudi Arabia from 4th to 8th November 2023 to participate in the 3rd KAUST Research Conference and to deliver an invited lecture.

12. Dr. Karunakaran Venugopal, Principal Scientist visited the laboratory of Prof Jan Behrends, Fachbereich Physik, Freie Universitat Berlin, Germany from 11.10.2023 to 02.11.2023.

13. Dr. Achu Chandran, Sr. Scientist visited France from 16th to 26th November, 2023.

14. Dr. Achu Chandran, Sr. Scientist visited the National University of Singapore, Singapore from 01.12.2023 to 31.03.2024.

15. Dr. C. Anandharamakrishnan, Director visited Norway from 12th to 16th March 2024 to conceptualize, formalize, and strengthen research and Technology collaborations between India and Norway through CSIR/DSIR.

AWARDS

Dr. C. ANANDHARAMAKRISHNAN

Kerala Academy of Sciences Fellowship 2023
National Academy of Agricultural Sciences (NAAS) Fellowship
AC TECH Distinguished Alumni Award 2023

Dr. E. BHOJE GOWD

CRSI Bronze Medal -2024

Dr. ACHU CHANDRAN

Scientific High Level Visiting Fellowship (SSHN)-2023 by The French Institute in India (IFI)

Dr. PARTHA KUNDU
2023 EAES International Award for Environmental Biotechnology.

Dr. ANJINEYULU KOTHAKOTA
Fulbright-Nehru academic and professional excellence fellowships, 2024.

PETA India Vegan Fashion Award 2023 for best innovation in textile.

Dr. HARSHA BAJAJ
MERCK Young Scientist Award 2023 (Biological Sciences)

CSIR Young Scientist Award 2022 (Biological Sciences)

Kerala Young Scientist Award 2023 (Biological Sciences)

Dr. N. RAMESH KUMAR
Raman Research Fellowship for the year 2022-23.

MR. NAGASRINIVASU G.

Merit Award
Andhra Pradesh Photography Akademi
Micro Photography Contest

Six Spots laying eggs

#CSIR-NIIST in the News

NIIST holds science outreach event for school students

The Hindu Bureau
THIRUVANANTHAPURAM

CSIR-NIIST, HAL sign pact on defence, aerospace

The Hindu Bureau
THIRUVANANTHAPURAM

NIIST Displays Vegan Leather Technology as an Alternative to Synthetic Leather

NIIST to inaugurate treatment unit for recycling greywater on June 5

The Hindu Bureau
THIRUVANANTHAPURAM

Researches

തദ്ദേശ വകുപ്പും മലിനീകരണ നിയന്ത്രണ ബോർഡും എൻ. ഐ. ഐ. എസ്. ടിയെ ഗവേഷണ – വികസന പങ്കാളിയാക്കും

NIIST inks MoU with Khadi Board

The Hindu Bureau
THIRUVANANTHAPURAM

FSSAI to organise 'Eat Right Millet Mela' at CSIR-NIIST tomorrow

The Hindu Bureau
THIRUVANANTHAPURAM

The 'Eat Right Millet Mela' is being organised in

Food Safety V.B. Vinod will preside.

the global hub of millets. The event is meant to

ശുചിത്വ മിഷനുമായി കൈകോർത്ത് സിഎസ്ഐആർ നിസ്റ്റ്

NIIST to Showcase Technology to Turn Biomed Waste into Soil Additives

Seminar on IPR to be held at NIIST on July 26

The CSIR-National Institute for Interdisciplinary

NIIST to hold meet on rubber, allied products on June 19

The Hindu Bureau

NIIST, KSCSTE join hands for collaborative research

The CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) has signed an

Meet on waste disposal

The Hindu Bureau
THIRUVANANTHAPURAM

കൈതച്ചക്കയിൽ നിന്നു ലെതർ ബാഗ്; പഴങ്ങളിൽ നിന്നു പാദരക്ഷ

NIIST, VSSC ink MoU for materials in space programmes

CSIR launches nat'l mission on sustainable packaging solutions

EXPRESS NEWS SERVICE

The Council of Scientific and Industrial Research (CSIR) on Saturday launched a

NIIST, VSSC ink MoU for materials in space programmes

Times News Network

T'puram: The National Institute for Interdisciplinary Science and Tech-

contracting on doing it within India all the time. For example, the materials we use for our rockets and satelli-

Glucosidase production process transfered for commercial use

T'puram: Council of Scientific and Industrial Research (CSIR) has transferred for commercial use, th cess for

CSIR launches nat'l mission on sustainable packaging solutions

EXPRESS NEWS SERVICE @TPuram

The Council of Scientific and Industrial Research (CSIR) co

the city. The

സിഎസ്ഐആർ സാങ്കേതികവിദ്യയിൽ ധാന്യാവശിഷ്ടം പാത്രങ്ങളാകും

ഗ്രേ–വാട്ടർ ട്രീറ്റ്മെന്റിന് പിന്തുണയുമായി സിഎസ്ഐആർ–എൻഐഐഎസ്ടി

CSIR-NIIST, VSSC to scale up research for space prog

EXPRESS NEWS SERVICE @TPuram

CSIR-NIIST transfers technology for single-use biodegradable tableware

EXPRESS NEWS SERVICE @TPuram

THE National Institute for

The utilisation of agro residues for the production of biodegradable products will help increase the

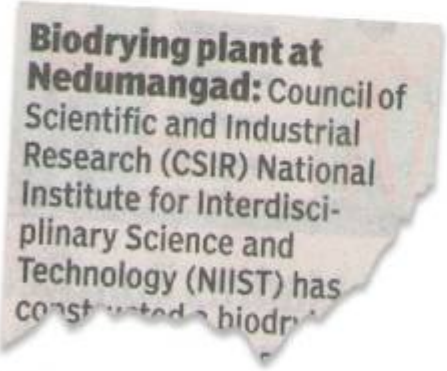
of farmers th

ue addition and also reduce the severe air pollution caused by these stubble

NIIST transfers know-how for treatment of organic waste water

The Hindu Bureau

THIRUVANANTHAPURAM



Biodrying plant at Nedumangad: Council of Scientific and Industrial Research (CSIR) National Institute for Interdisciplinary Science and Technology (NIIST) has

CSIR-NIIST offers technical support in grey water treatment and reuse

EXPRESS NEWS SERVICE @TPuram

makrishnan said the institute's expertise in the area could be

IST's environmental technolo- gy divisions.

CSIR, Thiruvananthapuram, leading institution engaged

സ്വയം ചാർജ് ചെയ്യുന്ന സോളാർ ബാറ്ററികൾ വികസിപ്പിച്ച് നിസ്റ്റ്

Scientists come up with sustainable alternative to one-time use batteries

EXPRESS NEWS SERVICE

Global recognition

New efficiency record set in indoor light harvesting

Times News Network

Thiruvananthapuram: In a

hout the need for battery re- placements.

approach. Copper is not only abundant, but also, envi-

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